January-February 1994

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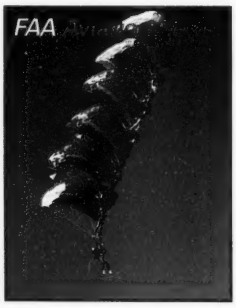
Pilot Puzzle . . . . . *Inside Back Cover*



Front Cover: *A canopy formation team joins up over Wisconsin. The largest formation record, held by the U.S, is 38 canopies (parachutes). Photo by Andre Jesmanowicz, U.S Parachute Association*

Back Cover: *This Sun 'N Fun photograph is a reminder that spring time flying activities are just around the corner. Photo by H.D. Chamberlain*

Another Step Toward Rebuilding

Photos and story by Phyllis Anne Duncan, *Editor*

"Hi, I'm David. What do you fly? A *Skyhawk*? Great airplane. Me? A *Baron*, but I had to sell it. I'm without my own airplane for the first time in 20 years. I miss it. How about you, what do you fly? A Mooney? Another great bird. . . "

What else do pilots who meet for the first time talk about except what each flies? The snippet of conversation above seems fairly typical, then, until you know that the speaker is FAA Administrator David R. Hinson.

The occasion was his speech before the 38th Annual Convention of the Aircraft Owners and Pilots Association, held in Orlando, FL, this past November and attended by a record 7,000+. Hinson was late beginning his speech because he spent several minutes "working the room," going from pilot to pilot, shaking hands and "hangar flying." Bearing no visible identification of his role, he strolled almost anonymously among the attendees who had gathered to see him, his presence given away only by the number of photographers cataloging his walk for posterity.

One perplexed pilot turned to another and asked, "Who did I just shake hands with?"

"Administrator Hinson."

"The FAA Administrator? Why, he seems like a regular guy."

Hinson began his "speech" by saying he was pleased to be among "real pilots who fly real airplanes for real fun." He then set aside his prepared speech and spoke for over an hour off the cuff, reminiscing about his "40 years as a customer of the FAA." During his tenure as an airline pilot, airline president, Fixed Base Operator (FBO), and airplane owner, he indicated he had encountered the occasional problem with an individual in the FAA, but he was now proud to head "the world's finest aviation safety organization with the world's leading fund of aviation knowledge." The United States, he said, "offers more opportunities for flying in a safe environment than anywhere in the world. We have the finest general aviation environment anyone could want." All this stems from the FAA doing its job.

However, he added that organizations like AOPA need "to make a lot of noise" because FAA must compete with many other agencies and departments for federal resources. This "noise" also makes FAA sensitive to the concerns of general aviation. He added, "I want to be and will be an advocate for general aviation. I believe in general aviation."

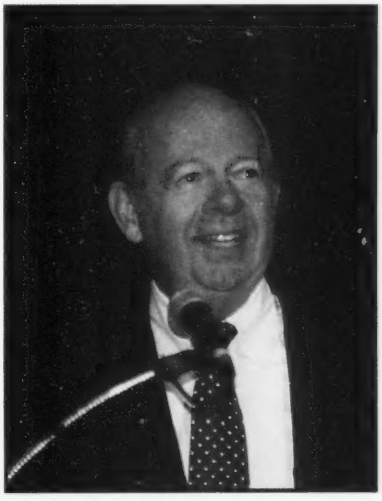
Airline Commission and National Program Review

Hinson briefly covered the results of the President's Commission on Airlines and the Vice President's National Program Review and their possible effects on the functions of FAA. The one of most concern to the people in the room was the privatization of the air traffic service. AOPA has gone on record opposing the suggestion of the National Program Review that the air traffic system be changed to either a private, public, or government corporation.

Problems with the procurement and budget processes have slowed air traffic modernization, and privatization would alleviate a great deal of red tape involved in budgeting and procurement. A non-government air traffic service would also not be subject to government personnel practices, meaning controllers could be hired—and fired—without the process of appeal granted to government workers.

On the other hand, some sort of user fee for a private air traffic service would probably have to be charged. Hinson cited the example of many other countries around the world who have private air traffic control.

Hinson reported that the FAA is currently studying the feasibility of privatizing air traffic, but that the look will be "a long, hard" one. Given the current safety record, "you have to think a long time about changing a system that works so well." For example, in a recent year, "there were 144,000,000 operations in the air traffic system with a delay rate of .075%, of which .4% were weather-related."



FAA Administrator David R. Hinson

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Mike McGowan

U.S. Parachute Association

by H. Dean Chamberlain, *Associate Editor*

According to the United States Parachute Association's training manual, "The first rule for all skydivers is to land with an open parachute." *The Skydiver's Information Manual* then goes on to list another rule, "Don't hit an obstacle upon landing." Like other aviation rules, they both state the obvious. The problem is, like other aviation rules, getting everyone to learn and to obey the rules.

Although the two skydiving rules seem very basic, there is nothing basic about today's sport of skydiving. For those who have not kept up with the sport, skydiving is as different today from the old images of World War II paratroopers leaping from C-47's as today's automobiles are from the cars of that era. Like today's cars, today's skydivers and their equipment come in a wide variety of colors, styles, and shapes. Today, you see skydivers dressed in multi-colored florescent jump suits landing beneath rainbow-colored square parachutes. Quite often that skydiver is a woman. Today, skydivers range in age from teenagers and young adults to senior citizens. Not only is skydiving open to men and women, young or old, it is open to many physically challenged persons. Although there are certain minimum physical requirements that should be met, just about everyone can skydive today using some of the new techniques developed over the last 10 years or so. In many cases, skydiving is a family affair.

Gone are the days when your basic macho male ex-military parachutist jumped surplus military round chutes in classic government white, orange, or green. Today, like other active sports such as skiing or scuba diving, skydiving has undergone a technological evolution involving new and safer designs, lighter materials, better training, and the addition of exciting colors such as vibrant reds, yellows, pinks, and blues. For the daring, they can now buy hot florescent colors to match their spirit. For the more conservative skydiver, equipment in classic black is still available.

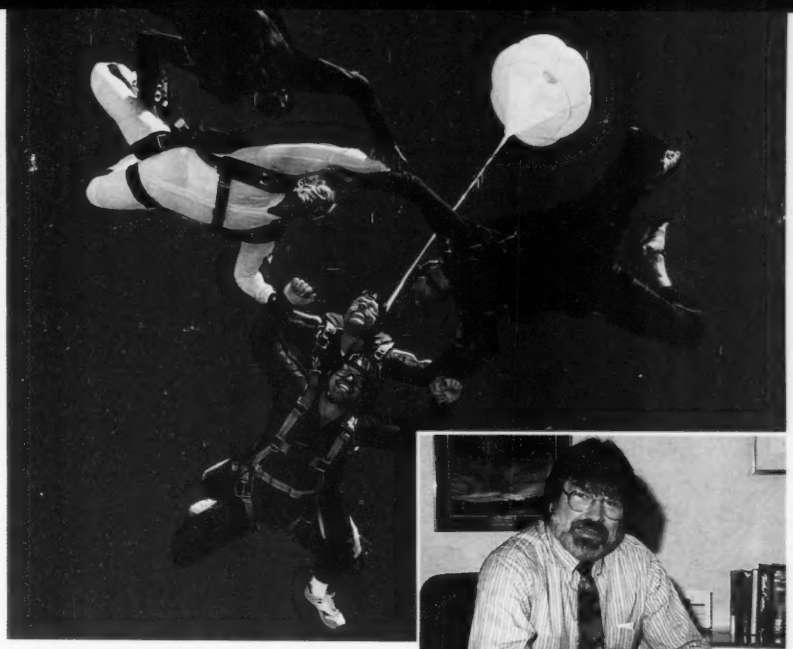
This change in equipment and its resulting increase in the sport's safety record has contributed to the increased numbers of people trying the sport. This change in the sport has been highlighted in some recent movies and television commercials. Some commercials feature skydivers sky surfing for today's soft-drink generation. All of these changes and the increased media exposure resulting from the changes have resulted in a dramatic increase in the number of people taking that first leap. Helping to make that first leap more exciting and safer is a technique called tandem parachute jumping.

During a tandem jump, a qualified, experienced instructor is attached to a student by a harness that is then connected to a parachute system built for two. The advantages are many. For those who only want to make one jump, they can make that jump with a minimum amount of training because the tandem instructor is there to teach and help the student during the entire jump from exit to landing. In the past, first-time jumpers had to spend hours training for any anticipated emergency before they could make their jump. Now, using the tandem technique, they can enjoy that jump with only about a 30 minute to one hour training period before they jump, knowing that if they have a problem an expert is there to handle it. The technique is also used for student training beyond the first jump. It accelerates student learning as a student prepares for his or her first solo jump. Before a student's first solo jump though, the student should be trained to handle normal emergencies as part of the student's training. Proper training is important. Expert training is needed because like other active sports such as flying, scuba diving, or mountain climbing, skydiving has risks. Death or serious injury is possible. Like pilots, scuba divers, or mountain climbers,

skydivers can substantially reduce their accident risk through the use of good equipment, use of available safety devices, proper training, and by following established and accepted rules and safety procedures.

Like the other articles in our FAA/Industry Partnership Series, we are recognizing one of the major membership groups within sport parachuting that is dedicated to promoting safety within the sport. It does this by working with the FAA and by setting standards and operating requirements for its member skydivers and drop zone (DZ) operators that make up part of the largely self-regulated sport of skydiving. That membership group is the United States Parachute Association (USPA) headquartered in Alexandria VA. Located just across the Potomac River from Washington DC, the not-for-profit USPA Inc., has an interesting history in sport parachuting. Since its founding, USPA has been a division of the National Aeronautic Association (NAA) in the United States and is the official U.S. representative of the Fédération Aéronautique International (FAI) in the U.S. For those not familiar with FAI, it is the international aviation organization based in France that oversees sport aviation and recognizes aviation records set world-wide. As a recognized representative for parachuting and skydiving activities in the U.S., USPA plays an important role in developing rules and safety procedures for its members that are recognized throughout the sport and world.

Sport parachuting or skydiving is somewhat like the ultralight vehicle movement in the U.S. Although the FAA has specific regulations that deal with both, FAA considers both to be self-regulating sports. As a result, FAA regulations are designed more to protect those on the ground than those in the sport. FAA sets only minimum standards for the sport. FAR Part 105, Parachute Jumping, only outlines where and under what conditions intentional parachute jumping may occur, what FAA-approved equipment is required, and the responsibilities of the skydiver and/or jump-plane pilot. FAR Part 105 and other rules that deal with parachuting do not get involved in the specific training of skydivers and certain other aspects of the sport.



William Boettcher

Highly qualified jumpers join a tandem skydiving instructor and his first-jump student.

USPA Executive Director, Jerry Rouillard

Because FAA considers skydiving a self-regulated sport, individual skydivers are responsible in large part for their own safety and training. This self-regulating, individual responsibility aspect of the sport can create a potential problem for someone not familiar with the sport. In a sport where there is a possibility of death or serious injury, the question becomes one of how can someone who wants to make a jump learn what is safe and not safe without knowledge of the sport.

The answer is USPA. As one of the two widely recognized industry groups, the other being the Parachute Industry Association (PIA) which represents primarily parachute manufacturers, USPA is recognized by the FAA as the industry group that sets training standards, issues USPA parachute licenses and ratings accepted by the industry, recognizes drop zone (DZ) operators who follow USPA standards, and promotes safety in the sport. With a membership of more than 27,000 jumpers, USPA officials believe their organization represents most of the dedicated skydivers in the U.S. According to USPA Executive Director Jerry Rouillard, only about 10 percent of all first-time jumpers continue in the sport. Many people only make one jump just to see what skydiving is like. In discussing first time jumpers, he made one point very clear. "No one should ever jump unless that person really wants to jump. No one should feel forced to jump as a result of a dare, bet, or because their spouse or significant other wants them to jump," he said. "Skydiving should be a personal decision made because you want to jump, not because of someone else."

During an interview with Rouillard and Jack Gregory, USPA's Director of Training, at USPA headquarters, they discussed many aspects of USPA. Both are proud of USPA's current growth rate. For the last several years, USPA's membership has grown at a rate of about 12 percent per year, and this past year is no exception. They attribute USPA's growth rate to several factors. One is the public's increased awareness of the sport. Another is the technological advances made in the sport. Today's new, light-weight equipment makes it easy for more people to participate in the sport. Both men believe the major change in the sport has been the development of tandem jumping.

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Skydiving Flight Safety

Many skydivers think mainly about their next jump, not how they are going to get to their jump altitude. Recently, FAA has identified a safety problem related to skydiving that both USPA and the FAA are working to solve. The problem is the safe operation of jump aircraft used by skydivers. For example, two aircraft accidents in the recent past killed 27 people. That number includes both jumpers and pilots. Over the years, incidents of fuel starvation, mechanical problems and other aircraft-related problems at drop zones indicate that pilots, drop zone operators, and skydivers may not have been paying as much attention to the safe operation of their jump aircraft as they should. Part of the problem may be a desire to get as many people in an aircraft as possible and drop them as quickly as possible. In the process certain Federal Aviation Regulations (FAR) dealing with safety may be compromised. Part of the problem may be the pilot-in-command's failure to comply with appropriate Federal Aviation Regulations. Part of the problem may be skydivers' and especially first-time skydivers' lack of knowledge of safe aircraft operating requirements.

One of the factors identified in the above crashes was that some of the jumpers were not wearing seatbelts.

In the past, some skydivers were reluctant to wear seatbelts in jump aircraft because they believed that they needed to be unrestricted so they could jump out of the aircraft in case of trouble. At jump altitude this idea might work, but at low altitudes such as during takeoff where most aircraft accidents occur there is normally not enough altitude for a parachute to function. FAA believes that some aircraft accidents have been caused by the pilot's loss of aircraft control because of the rapid change in aircraft weight and balance as skydivers tried to exit the aircraft. Another problem with jumpers not wearing a restraining device in an aircraft involved in either an accident or during a quick stop on the runway on takeoff is the fact non-restrained jumpers can interfere with the pilot or the controls and cause loss of aircraft control, or the jumpers can be seriously injured when they impact the aircraft's structure when the aircraft stops suddenly. In either case, skydivers increase their risk exposure to serious injury or death in a survivable accident by not wearing a restraining device. Like an automobile driver or passenger, parachutists are statistically safer restrained in an aircraft than when they do not wear a restraining device.

For those wondering why we are using the awkward term, restraining device, the answer is simple. Not all aircraft have seats for skydivers. In most aircraft, the seats have been removed to aid jumpers exiting the aircraft. Jumpers sit on the floor. The question now is for the FAA and the parachute industry to develop a restraining device that is both safe and non-binding that jumpers will wear. Devices are available. The problem is getting jumpers to wear them. A non-binding restraining device is important because some skydivers fear that a seat belt or restraining device might get tangled in their equipment and either jeopardize the safety of their jump or result in their parachute opening in the aircraft. The problem facing the industry is developing a restraining device that provides the required level of safety needed and one that all jumpers will use.

Finally, although it is not the intention of FAA to make skydivers into pilots so they will know how to preflight and operate a safe jump aircraft, there are some common sense things that all skydivers should consider before going for that next one-way plane ride. Also, it is important for skydivers to remember that the FAA does not consider parachutists as aircraft passengers in the same way it defines passengers under FAR § 91.111(c) or in commercial operations and under FAR Part 121 or 135. FAA considers parachutists as aircraft occupants rather than as passengers as defined in the FAR. Occupants, although not considered aircraft crew members by the FAA, are considered by the FAA to be part of the operation, and therefore, they should be knowledgeable of aircraft and parachuting operations. The following are a few helpful tips for being an informed occupant.

1. Does the aircraft look safe. Aircraft used to fly jumpers take a lot of abuse. Although looks may not be a true indicator of the quality of maintenance an aircraft receives, generally speaking, an operation that takes care of an aircraft's appearance also takes care of its problems.

2. How well is the aircraft being maintained? If you have any doubts, you should talk to the aircraft's pilot.

3. How experienced is the pilot? Although jump pilots are not required to have a commercial pilot certificate unless flying for hire, the unique requirements of flying jumpers requires a level of experience that some new pilots may lack. Aircraft handling can change as jumpers move to the door and exit.

4. Is the plane only carrying the number of jumpers authorized. The number may be found in the aircraft's operating handbook and certification paperwork. That number may be modified by an authorized supplemental type certificate (STC) change or FAA field approval change made to that aircraft. Some aircraft require FAA-approved changes for skydiving. Aircraft weight and balance requirements must be within approved limits for safe flight.

5. Are restraining devices provided for the authorized number of jumpers?

6. What is the role of the jump master in aircraft operations.

7. What type of pilot briefing is provided jumpers before takeoff?

These are only some of the types of questions jumpers should ask about their jump aircraft and the pilots who fly them. As we said in our article, although the FAA and USPA work to promote safety in sport parachuting, ultimately, each skydiver is responsible for his or her own safety. A responsibility that starts on the ground and does not end until that jumper is safely back on the ground again. To paraphrase two of USPA's rules, to be safe you should always land with an open parachute and don't hit any objects upon landing.

Safe jumping.

Tandem parachuting was developed by two parachute manufacturers. Tandem jumping was authorized under an FAA exemption to FAR Part 105 issued in 1984 and subsequently renewed. The exemption authorized the companies and their respective employees, representatives, and other volunteer experimental parachute test jumpers under their direction and control to make tandem parachute jumps as part of an ongoing test program. Because of the importance of tandem jumping to the industry and the expiration of the current exemption in 1994, USPA is part of an ongoing industry/FAA group reviewing the status of tandem jumping. The outcome of the group's review could be a proposed rulemaking change to FAR Part 105 authorizing tandem jumping.

Mike McGowan

Jonny Goss and Graham Godding record a straddle stand-up during Skyblazin' 92's compulsory round over Skydive Arizona.

Steve Scott

A 4-way freefall formation team exits from a Cessna over Perris, CA.

WHY USPA

Safety is the most important reason for joining USPA or training at a USPA member drop zone. As we stated earlier, in this largely self-regulated sport, FAR Part 105 does not require a skydiver to have an FAA license to jump. What this really means is that the only industry licensing system that recognizes any "level of demonstrated skill, knowledge, and experience, ranked according to the level of accomplishment" is that of USPA. USPA's minimum training standards for licensing its members, its instructors, and participating DZ operators are internationally recognized by FAI member countries and by the FAA. Not having a USPA issued parachuting license will not prevent anyone from skydiving if they want to jump. But if they want to compete in international competition or instruct at USPA Group Member Training Centers, they must have a USPA license. The reason they need a USPA license is because someone having one of USPA's four parachuting licenses, A, B, C, or D license with D being the highest, has demonstrated his or her ability to safely skydive. The same is true of someone having one of USPA's instructional ratings such as its jumpmaster, instructor, or instructor/examiner rating. The rating identifies someone who has not only demonstrated his or her skydiving ability, but also his or her ability to teach skydiving.

This is important for potential skydivers because it provides them with a basis for comparing training programs as well as verifying an instructor's skill, knowledge, and teaching ability. Since skydiving is one of those sports where a serious error can be fatal, proper training is critical to all involved in the sport. USPA provides a recognized industry standard for that training. Another benefit of USPA membership is the fact that USPA not only sets standards for its members, it also requires USPA drop zone operators to operate according to specific standards both in terms of skydiving training and related activities as well complying with responsible business practices as a condition of membership. What all of this means for someone interested in learning how to skydive is that they can look to USPA and one of its Group Member USPA drop zone operators and USPA instructors as a means of getting good training. If the operator and instructor follow required USPA guidelines, you should receive training designed to minimize your accident risk and make you a safe jumper. Training that is recognized both by the sport parachute industry and the FAA.

Because every jump carries a certain amount of risk, every jumper needs good training to reduce that risk to an acceptable level. If you do not feel comfortable making a jump, don't jump. Only the individual jumper knows how he or she feels about any particular jump. When in doubt, don't jump. To minimize the inherent risk involved in the sport, all new and non-current jumpers need to get quality training or recurrent training at a reputable drop zone before they jump. USPA Group membership is an industry recognized way of finding such an operator. ■

To learn more about the exciting sport of skydiving or benefits provided by USPA, you can visit a USPA Group skydiving center near you, or you can contact USPA headquarters in Alexandria, VA, for additional information. Upon request, USPA will send anyone who asks, a "Dear Friend" skydiving information packet. USPA can also provide you a list of the USPA Group Member drop zones near you. USPA's address is United States Parachute Association, 1440 Duke Street, Alexandria, VA 22314. USPA's telephone number is (703) 836-3495. Its FAX number is (703) 836–2843.

Piper Aircraft Corp.

Pilot Decision Making

by Tom Hamilton

Do You Remember How?

Decision Making

This is Part Six of a seven-part series that first appeared in *Balloon Life* magazine in 1989 and was originally written for balloon pilots. We have left the lighter-than-air examples in because the overlying issue of pilot decision making affects all pilots. ***—Editor***

You have made the commitment to ballooning, bought the balloon, taken the flight instruction, passed the written exam, passed the oral exam, and passed the flight check. Now you are a licensed pilot—it says so in black and white. What a way to enjoy those lazy days just floating in the skies. As time goes along how much of what you learned do you remember?

This issue of our continuing series on Pilot Decision Making examines skill retention. A few years ago the Federal Aviation Administration conducted studies on pilot skill retention. In this article we will take a look at some of the information that was gathered.

Some pilots find it difficult to believe that human learning, once acquired, is not stored permanently in the mind—as is possible with computers. But the fact is that human intelligence retention is selective; we retain both skills and knowledge in proportion to their use and apparent importance to our survival. The process of forgetting can begin almost the moment we walk off the landing site with a newly acquired certificate or rating in hand. This is certainly true for general aviation pilots who may fly infrequently and irregularly, in between work and family demands on their time, i.e., those who fly for pleasure or recreation, or for occasional business convenience.

Some understanding of how rapidly the night skills of pilots can erode resulted from a study conducted at the FAA's Technical Center in Atlantic City, New Jersey. The study was designed to track the retention or loss of pilot skills over a 24 month period following certification as a private pilot (fixed wing); and to observe the effect of additional training on retention of the initial skill level. A secondary objective was to learn how accurate recently certificated private pilots were in predicting their ability to carry out basic flying tasks and in evaluating their actual performance.

The group of pilots studied consisted of 42 subjects, with an average age of 25. At intervals of 8, 16, and 24 months they were individually tested and rated on their performance of 29 basic flight tasks. Some were given additional training towards instrument and multi-engine rating in the intervals between flight checks. The pilot subjects were all told in advance exactly which tasks they would be tested on. They were also invited to predict how well they thought they would do on each task, and to comment later on their performance. During the 24 months of the study the pilots as a group average about three hours of flying per month. However. those who received no advanced training flew less than one hour a month.

In scoring the subjects' performance on the 29 basic flight tasks, the investigators used as a base line the score recorded during their private pilot testing on these same tasks. Over the 24 month test period the group as a whole averaged a 33 percent increase in flight task errors. Pilots who had performed at least nine out of ten flight tasks correctly during their initial testing now completed only six out of ten tasks correctly, on the average. (Their written test scores also dropped by about 16 percent.)

The study concluded that recently certificated pilots who do not fly regularly undergo a rapid and significant deterioration of their ability to perform flight tasks. (No definition of what it is to "fly regularly" was attempted.) Some pilots in the study logged as many as six or more hours a month in the first eight months, including instrument and multi-engine training, yet committed nearly as many errors in the test at the end of the period as other pilots who flew less than one hour per month and received no advanced training.

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The study observed that some types of advanced training were helpful in reducing skill erosion, but the effects were temporary in any case. (See Figures 1 and 2) Not only recently certificated pilots, but the majority of the general aviation pilot population was considered susceptible to rapid skill erosion—i.e., "forgetting"—in the absence of some form of continuation training.

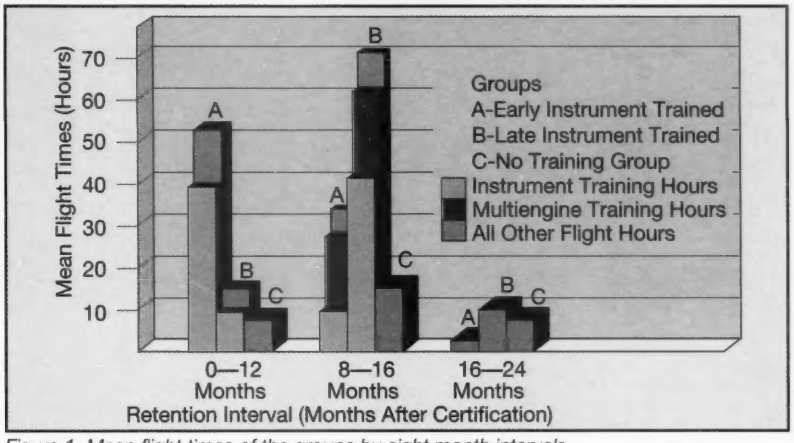

Figure 1. Mean flight times of the groups by eight month intervals

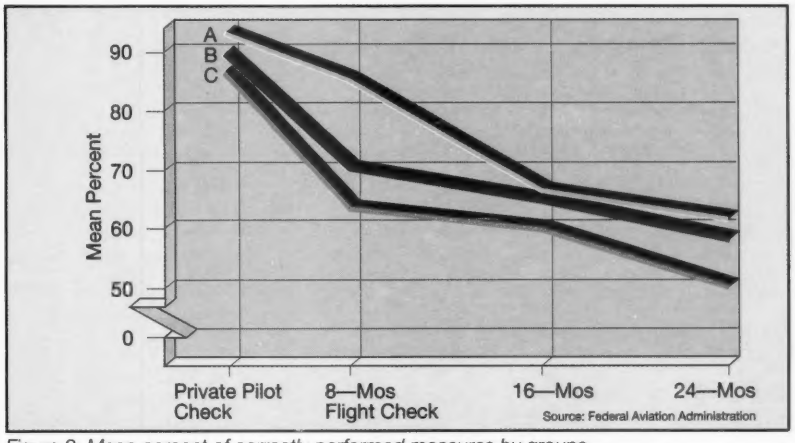

Figure 2. Mean percent of correctly performed measures by groups

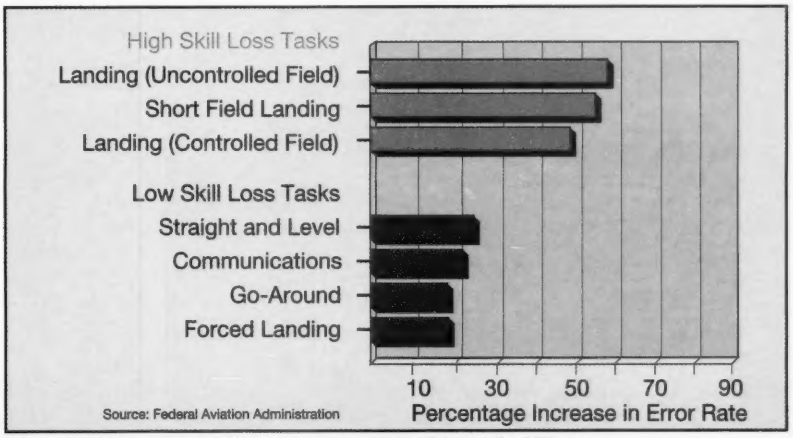

Figure 3. Flight task exhibiting greatest and least 24 month skill loss

The self-prediction and self-evaluation forms completed by the subject pilots largely failed to conform to the errors in their actual flight task performance. In other words, their assumed level of competence was much higher than their demonstrated performance.

In this connection the FAA-required Biennial Flight Review (BFR) serves an important purpose in calling attention to unsuspected skill weaknesses in the basket. However, the responsibility for taking appropriate remedial actions, following the completion of a BFR, rests with the individual. Many pilots apparently assume that they can improve their skills by resolve alone, rather than by means of scheduled practice or training—which is illusory.

Skill retention or loss in flying is generally divided into two kinds; cognitive/procedural and control oriented—or, more simply put, mental versus manual tasks. The study confirmed the widely held belief that the most serious skill loss is in the mental area.

It should be noted that these errors did not necessarily constitute an unsafe flight condition, insofar as the pilots were able to complete the maneuver without incident, but there was clear evidence that flight skills had eroded since certification, and presumably would continue to erode given the present pattern of flight activity.

Some of the flight tasks which in this study showed the greatest and least degree of skill loss during the 24 month test period are shown in Figure 3. Note that those with minimal skill loss are primary control-oriented, with sources of immediate feedback.

Ideally, skill retention is best reinforced with continued flight practice, training, and testing.

Next issue will look at some programs that pilots can participate in to improve their skill retention. ■

Our thanks to Mr. Tom Hamilton, publisher of Balloon Life *and author of this series, for permission to reprint this and subsequent articles. For subscription information contact Mr. Hamilton at 2145 Dale Avenue, Sacramento, CA 95815; (916) 922-9648.*

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Architect of the Capitol's Office

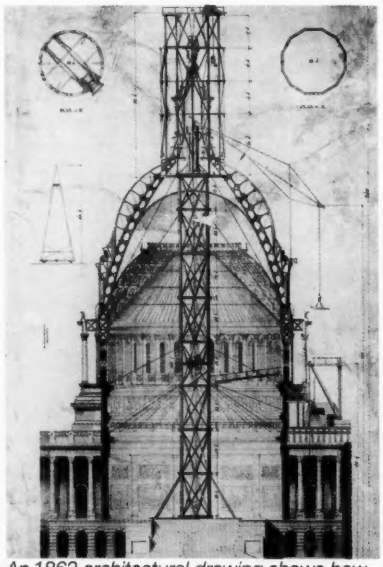
HELICOPTER SAFETY

by H. Dean Chamberlain, *Associate Editor*

It is not often that a helicopter crew receives the kind of attention this crew did on what they described as a relatively simple job. For them the job was easy, but then making a job look easy is the mark of a true professional, and this crew was professional. If the job was routine, the attention the job received was anything but routine. Few jobs get the national exposure this one did when phase one was done, let alone the attention the job received when phase two was completed months later.

The first part of the job was done on Mother's Day 1993 as a few thousand spectators and several news media camera crews gathered to watch what many believed would be a historical moment. A helicopter was going to take off from the Plaza area in front of the U.S. Capitol and pluck the 15,000 pound, 19 and a half foot Statue of Freedom from its perch on top of the Capitol where it had stood for the last 130 years. Then the helicopter would lower the statue to the Plaza for months of restoration work. Finally, the helicopter would land back on the Plaza before departing. According to the crew, the job was simple compared to some of their typical jobs of moving heavy, external loads around buildings and hazardous construction sites. But this was not one of their typical jobs at some out of the way construction site.

Not only was the Statue on top of the U.S. Capitol in Washington, DC, but as everyone knows, nothing in Washington, DC is ever simple. According to Mr. James Cieutat, Project Director for the Architect of the Capitol's office, there were many agencies, contractors, and workers with some role in the project. The FAA was one of the agencies involved. Then like many Washington projects, the selection of what helicopter organization was going to remove and later replace the statue was controversial. First a National Guard unit was supposed to do the lift. Then the President of Helicopter Association International, Mr. Frank L. Jensen, Jr., and Erickson Air-Crane Company of Central Point, OR protested that this type of service was available in the private sector and that a civilian company should get the job. In the end, Erickson Air-Crane which specializes in this type of work was awarded the contract for the job. Erickson demonstrated again the unique abilities of general aviation helicopters to perform those special missions that helicopters can do so well. The company, using a Sikorsky *Skycrane* (S-64F) helicopter, quickly picked up the statue and gently lowered it onto a special mount built near the entrance to the Capitol. According to Max Evans, the pilot in command, the ease with which the job was done was a reflection of the experience of the crew and workers involved and the planning that went into the job. Part of that planning involved the FAA's Washington Flight Standards District Office (FSDO). Why was the FSDO involved? Its involvement can be summed up in one word "Safety." According to Mr. Bill Osborne, the FAA aviation safety inspector assigned the project, he was there to ensure the job was done according to safe operating procedures described by the operator and approved by FAA. Procedures designed to primarily protect those on the ground in case of an accident involving either the helicopter or the external load. FAR Part 133, Rotorcraft External-Load Operations, lists the certification requirements



An 1863 architectural drawing shows how Statue of Freedom was originally installed.

H. Dean Chamberlain

FAA Safety Inspector Bill Osborne (Right) checks Larry Pravecek's pilot certificates.

H. Dean Chamberlain

FAA Safety Inspector Bill Osborne (Left Front) watches as "Bubba" is prepared for the day's job.

for operators, crew members, and aircraft used in external load operations. The FAR also lists the required equipment as well as procedures for working with external loads.

One of those requirements is that, whenever a helicopter is going to carry an external load in a congested area, a congested area plan must be developed for FAA approval before the job can be done. From verifying the qualifications of the crew to reviewing the emergency plans for dropping the load in case of a problem, to inspecting the job site, FSDO inspectors are frequently involved in many aspects of a congested area job.

This job was no exception. Inspector Osborne met with government and company representatives days before the mission to review the plans and to conduct an on-site inspection. He would later check and monitor the actual operation. Throughout the planning and actual job, the FAA's emphasis was placed on flight safety, including the safe entry and exit of the helicopter in the Prohibited Area (P-56) surrounding the Capitol Area, the development of contingency plans in case of a problem either with the helicopter or load, the safety of spectators watching the lift, and the safety of workers on top of the Capitol and those on the ground. As part of the area plan, a detailed inspection was made of the Capitol and surrounding area to ensure that all loose objects were secured to prevent them from becoming projectiles that could endanger the flight crew, the workers working with them on the project, or the spectators. The inspection also included structures that could be damaged by the rotor wash from the helicopter.

The project went off without a hitch including all of the resulting publicity.

What a difference five months makes in Washington.

For the October 23 reinstallation, company employees and crew members now wore custom-designed hats and shirts promoting the company's part in the restoration project as Inspector Osborne reviewed the company's confined area plan the day before the job. Again, he toured the grounds and Capitol with the crew and other Government personnel to ensure that no safety factor dealing with the actual external load was overlooked. This was one job where flight and load safety were critical. This job was special. After all, no one wanted to see the 15,000 pound Statue of Freedom go crashing through the Capitol Dome. Another factor was that although the removal and restoration of the statue received national attention when it was done, the reinstallation of the statue on top of the Capitol was going to receive Presidential attention. President Clinton and the leaders of the House and Senate were to be present to view the operation along with other members of Congress. On the morning of the job thousands of spectators went through security checks to gain access to the Capitol grounds to view the event as workers and the helicopter crew prepared for the reinstallation. National media representatives were on hand to record the operation. Everyone waited for the President's arrival. Once he arrived, the helicopter crew and workers placed the statue on top of the Capitol with the same ease and care with which they had removed it. Following a meeting with the crew, the President commemorated the bicentennial of the Capitol with a public ceremony on the West Front or Mall side of the Capitol.

Although the actual operation was comparatively easy, according to the crew the job only took about 13 minutes, the historic value of the operation was immeasurable. The operation demonstrated to the world that a professional crew using the right equipment and following prescribed safety rules can make even a Washington job look easy. Once more, aviation demonstrated that for those special jobs that aviation is uniquely qualified to do, it can not only do it safety, it can do it even when the President is watching. ■

Architect of the Capitol's Office

President Clinton and Congressional leaders observed the reinstallation of the statue.

H. Dean Chamberlain

Amateur-built Aircraft

by H. Dean Chamberlain, *Associate Editor*

How many ways can you tell when spring is coming? Melting snow is one way. Another is the sound of small aircraft taking flight after a long winter on the ground. For some, the best way of all may be the sound of aircraft construction as amateur-aircraft builders try to finish their projects in time for Sun 'n Fun. For those not familiar with Sun 'n Fun, it is the large, annual, spring time, Experimental Aircraft Association (EAA) fly-in in Lakeland, FL. In case anyone is wondering why we are talking about Sun 'n Fun, the answer is simple. It is the first, large, EAA event of the year and, like other EAA events, it is the gathering place of many amateur-built aircraft which is the subject of this article.

As many first-time builders work to complete their amateur-built aircraft in time for either Sun 'n Fun in April or Oshkosh later in the summer, it seems like a good time to review some important information about building and certificating such aircraft. We also want to point out some important information for those who go to either event and decide to build an aircraft.

In our recent series on FAA aviation safety inspectors (ASI's), we described some of the responsibilities of the airworthiness ASI's. As we said, airworthiness ASI's do more than just monitor the health and well-being of the commercially produced aircraft fleet. AW inspectors play an important role in the amateur-built aircraft community. They inspect and issue FAA experimental airworthiness certificates for amateur-built aircraft that meet applicable FAA standards under FAR Part 21, *Subpart H-Airworthiness Certificates.* They also can issue Repairman Certificates to those builders who qualify. These two ASI functions are the foundation of the amateur-built movement.

A quick review of Federal Aviation Regulation (FAR) § 21.191(g), *Experimental certificates, Operating amateur-built aircraft,* states in part that persons who have fabricated and assembled the major portion of an aircraft for their own education or recreation can request FAA certification of that aircraft as an experimental amateur-built aircraft. Then FAR § 21.193, *Experimental certificates: general*, outlines what a builder must do and what an FAA inspector must check before the inspector can issue an experimental airworthiness certificate for an amateur-built aircraft. To help builders meet the FAR requirements, the FAA has published several Advisory Circulars (AC) to help builders safely construct and fly their aircraft. One of these is the important AC 90–89, *Amateur-Built Aircraft Flight Testing Handbook*, which discusses important safety recommendations for those preparing for their amateur-built aircraft's first flight. Another AC, AC 20–27D, *Certification and Operation of amateur-built aircraft*, provides guidance and information about airworthiness certification and operation of amateur-built aircraft. In addition to the various AC's produced by the FAA, another important item published by the FAA's Flight Standards Service's Manufacturing Standards Section (AFS-613) in Oklahoma City, (405) 954–4103, is the *Revised Listing of Eligible Amateur-built Aircraft Kits* that lists the kits that meet the FAA's major portion requirement of FAR § 21.191(g). The latest issue, dated October 1, 1993, is available upon request from AFS-613. The list is important. If an aircraft kit is listed as having met the FAA's major portion requirement, this will assist the FAA inspector in determining that the kit meets the rule at certification time. This makes the certification process easier. Each builder should check the list for his or her specific model kit. Not all models of a given manufacturer may be approved.

Repairman Certificates

AW inspectors also can issue qualified aircraft builders a Repairman Certificate that allows them to maintain the amateur-built aircraft they built as well as perform FAA-required inspections on that aircraft. For those who qualify, it is a great deal. There are restrictions. For example, the certificate is only issued to a specific builder for a specific aircraft identified by make, model, and serial number. The Repairman Certificate does not allow the builder to do required inspections on any other aircraft. The exceptions are if the builder is a certificated pilot, that person can do preventive maintenance on another aircraft under FAR Part 43, and if the person is a certificated A&P mainte-

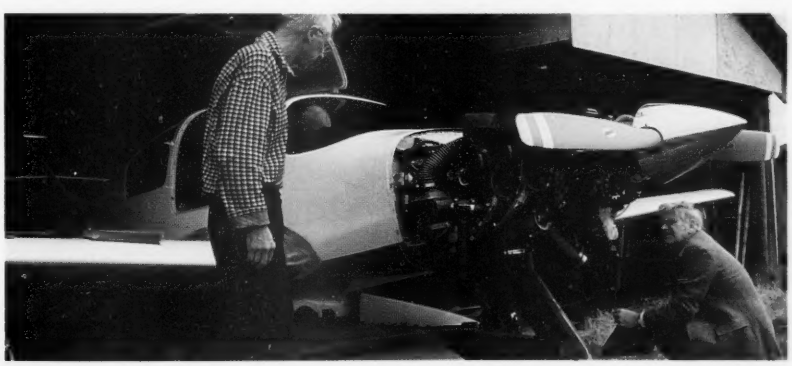
nance technician, he or she can work on other aircraft on the basis of the A&P certificate.

The theory behind issuing a Repairman Certificate to a person who builds an FAA-certificated experimental aircraft is simple. The person who built the aircraft or the major portion of that aircraft should be the most knowledgeable of that aircraft and its systems. Each amateur-built aircraft is unique, and there are no repair stations authorized to perform repairs on amateur-built aircraft. Before everyone runs to their local Flight Standards District Office (FSDO) claiming to be an aircraft builder, there are a few requirements that must be met. Repairman Certificates are only issued to builders who can document they have constructed the aircraft. If more than one person constructed the aircraft, only the team leader or the person who did the majority of the construction would be eligible for the Repairman Certificate. This is another good reason for keeping your builder's log up to date. For those individuals who are thinking about buying a partially constructed aircraft, if you cannot establish through the builder's log that you are the primary builder of that aircraft, then you will not be eligible for a Repairman Certificate. Repairman Certificates are not transferable to the new owners of an amateur-built aircraft. But, the person who holds the Repairman Certificate for that aircraft may continue to perform the condition inspections on that aircraft after it is sold. The only other person who can sign off a condition inspection is a certificated Airframe and Powerplant mechanic.

Potential builders thinking about building a kit aircraft should check with their local FSDO, FAA Manufacturing Inspection District Office (MIDO), or the following FAA electronic bulletin board (EBB) for amateur-built aircraft information before buying a particular kit and during construction. One reason is not all kit aircraft meet the FAA's major portion requirement for experimental, amateur-built aircraft certification. Some kits are too complete. Buyers of such kits are assemblers, rather than builders. Another reason is the certification and safety information either the offices or the EBB can provide anyone planning on building and certificating an amateur-built aircraft. (The bulletin board is the Safety Data Exchange Bulletin Board operated by the FAA Small Airplane Certification Directorate in Kansas City, MO. The EBB's telephone number is 1–800–426–3814. The password is SAFETY. The protocol is ANSI/VT100/300–9600 Baud/8/N/1. The EBB operates 24 hours per day.)

Construction Tips

Potential builders should check with their local FSDO, MIDO, or EAA chapter before and during any construction project because each can provide important construction tips. For example, builders should maintain a photographic and written record of construction to show compliance with the major portion requirement of FAR § 21.191(g). They should keep all material receipts. And they should develop a safe test flight program for their aircraft in preparation for their aircraft's certification. All of these and other construction and safety tips are designed to make certificating an aircraft easier and safer.



H. Dean Chamberlain

MINI PROJECT CHECKLIST

Since most airmen like checklists, the following mini checklist is a few representative ideas potential builders may want to consider before starting a project.

- Do you have the experience and ability to do the work. In the case of the Lenn brothers, they had already built one aircraft as well as a 60-foot motor yacht.
- Do you have the resources to complete the project. Many would-be builders start, stop, and then sell their projects when they either run out of money or time or both.
- Where are you going to build the aircraft? A living room is not the best place. Hangers can be expensive construction sites until needed for final assembly.
- Do you have your family's support for the project. Building an aircraft takes time, patience, money, hard work, labor and, if you have a family, family support. Is your family willing to help you when you need help? Are they willing to share "their" house or garage with "your" aircraft parts? Are they willing to share you and your time with the project?
- Building an aircraft does have its good points. One hot air balloonist whose family helped him make a balloon said the time the family spent working together on the balloon was worth more than the balloon.

These are only some ideas all builders may want to consider before starting a project. For more information, interested builders can contact their local FAA office, talk to other pilots, visit their local airports and look for builders, join local flying clubs, review the EAA video tape discussed earlier or contact one of their local EAA chapters to talk to members building or who have built an aircraft. You just might decide to build the project of your life.

H. Dean Chamberlain

Certification

Certification involves many things. Although the FAA's amateur-built aircraft certification information packages provide detailed instructions on the certification process, here are a few of the items an inspector will check for during any certification procedure. The builder must apply for and have an aircraft registration number (N-number) from the FAA in Oklahoma City for the aircraft before it can be certificated. The inspector will check the aircraft for acceptable construction based upon FAA/industry standards. Many of these standards are listed in the various FAA maintenance manuals available for sale from the Government Printing Office. Being able to show that these standards have been used is where a detailed builder's log or construction manual with good construction records becomes very important. The log should detail each step used in the construction of your aircraft. Each step should identify any materials (glues, wood, metal, etc.) or special tools used (jigs, alignment tools, etc.). This includes any tools you made to accomplish these tasks. All these items are taken into account when determining eligibility for certification. Again, a photographic history is also important. The photographs will be used to verify proper construction techniques and materials were used in hard to see or closed up areas not accessible by inspection holes. A photographic history of construction is a great help. The inspector will check for weight and balance information for the aircraft. And one of the most important segments of the certification process is the development of a safe flight test program for each amateur-built aircraft. As part of the certification process, a specified number of flight hours must be flown within a designated test area. The flight hour requirement is designed so a pilot can check the flight characteristics and construction of the aircraft in a safe area with minimal risk to those on the ground or to other aircraft in the air. Obviously in the interest of safety, passengers are not permitted on the proving flights. The flight requirement is important because although the FAA AW inspector can check the aircraft for such things as the use of acceptable construction techniques, and that the aircraft's weight and balance information have been computed, and other required items have been complied with, only a flight check can show that a particular aircraft's flight characteristics are safe. In essence, the aircraft's first pilot becomes its first test pilot.

Although a particular aircraft design may have hundreds of completed aircraft flying, each amateur-built aircraft is unique. Probably, no two models of the same aircraft design are ever constructed or equipped exactly the same. Upon certification, each amateur-aircraft builder becomes his or her aircraft's original manufacturer. As a result, although home-built models may look alike, because of possible undiscovered construction problems or changes made by its "manufacturer" during construction that might affect the aircraft's flight characteristics, every pilot flying a newly constructed aircraft on its first flight and later required certification flights must be prepared for any possibility. That is why a parachute, helmet, and appropriate safety gear are good things to wear during that first test flight because not every amateur-built aircraft survives its first flight unscratched. As outlined in the AC on testing amateur-built aircraft, a careful pilot will also have help standing by in case emergency assistance is needed as he or she flies off the required FAA flight test hours.

Flight Testing

To help builders and pilots test their aircraft, not all builders are pilots, the FAA's flight hour requirement will be listed as an operating limitation on the aircraft's experimental airworthiness certificate. The number of hours that must be flown is determined in part by the type of engine and propeller installed. (We are assuming a single-engine aircraft.) An aircraft with an FAA certificated engine and propeller requires less operating hours for example than one with non FAA certificated equipment. The reason is the FAA certificated engine-propeller combination does not have to reprove its airworthiness. That work was done during the combination's original certification process. Non-certificated equipment must be flown more hours to prove its reliability during a longer flight test period. The goal is to discover any potential safety problems in the aircraft or its systems before passengers are allowed to fly in the aircraft. The AC on flight testing amateur-built aircraft provides detailed ideas on how to develop a safe flight test program. Local EAA chapters can also provide builders guidance on safely testing newly constructed aircraft.

Any discrepancies discovered during the FAA certification inspection and flight hour requirement must be corrected and proper notification made to the FAA as part of the certification process. The inspector signing off the aircraft will outline how discrepancies must be corrected and notification made. The certification process also requires that future modifications to the aircraft be approved by the FAA. This is one reason it helps if detailed construction and test records are kept to verify that required actions have been completed and when.

Pilot Experience vs Risk

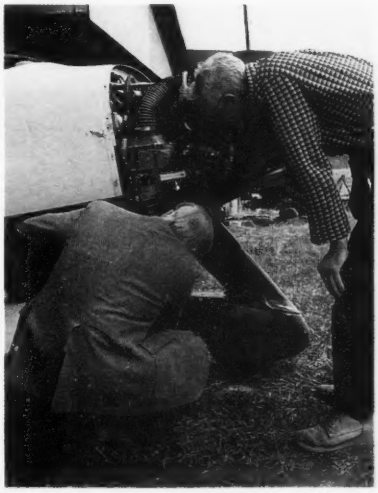
It is important that all pilots testing amateur-built aircraft know what they are doing and have a detailed plan for

testing the aircraft. History has shown that test flying amateur-built aircraft can be a high risk area for unqualified pilots. Qualification is not necessarily a function of total flight hours either. High-time pilots not familiar with a particular amateur-built aircraft's handling characteristics can have problems flying the aircraft the same as low-time pilots. The National Transportation Safety Board (NTSB) and FAA have the accident statistics to prove the risk factor. A casual review of an NTSB summary of more than 300 amateur-built aircraft accidents from January 1990 through December 1991 showed that only 38 pilots of those with reported pilot total flight time and time in type had less than 200 total flight hours. Only seven of those 38 pilots had less than 10 hours in type. The reason we call this review a casual one is because, in the summary, not every accident reported types of pilot time such as total time and time in type or the causes of the accidents. Some accidents had no pilot flight times reported. In many of the accidents, the pilots had thousands of flight hours with varying amounts of times in type. In one fatal accident the pilot had a reported 15,000 hours, but only 5 in type. In other accidents the pilots had many hours in type. Our point is anyone can have an accident. High-time pilots are not immune, nor is the number of hours in type a safety factor. What is apparent in looking at the summary is the number of reported accidents, fatal, serious, minor, and non-injury ones, that show one to five hours in type listed. The total is 38. This is approximately 10 percent of those accidents with flight hours listed. Although our safety review is not a scientific study of amateur-built aircraft accidents and their causes, we, *FAA Aviation News*, are saying that all pilots should exercise a greater degree of care when flying an amateur-built aircraft for their first few hours and especially if it is the aircraft's first flight. We are not saying that amateur-built aircraft are unsafe. We think that in some cases, the pilots, in the excitement of finishing their aircraft, may try to fly their new amateur-built aircraft without benefit of an adequate checkout. Some aircraft are hard to get checked out in. After all, where do you find someone to check you out in a one-place aircraft model that only has a few models flying. To minimize everyone's risk, we are suggesting that everyone flying any aircraft for the first time should exercise due caution. Particularly, if your first flight in the aircraft is the aircraft's first flight. Enough said.

H. Dean Chamberlain

Flight Experience

The key we believe is for any pilot planning on making the first flight in an amateur-built aircraft to have experience testing and flying amateur-built aircraft. Ideally, the pilot should have some experience flying the same make and model amateur-built aircraft before making that first flight in a new aircraft. At a minimum the pilot should have some experience in a similar design or type of aircraft. That experience could be in either an amateur-built or commercial aircraft with similar handling and speed characteristics. At a minimum, the pilot should talk to someone who flies similar equipment. This is one reason why joining a group such as EAA can benefit a builder or pilot planning on flying an amateur-built aircraft. The key is trying to learn from someone who has already done whatever you are trying to do.



H. Dean Chamberlain

As previously stated, to help reduce a pilot's first-flight risk exposure, the FAA has published guidelines on how to test new homebuilts that include pilot, aircraft, and equipment safety items, how to do high speed taxi tests, and how to develop a step-by-step test program. In addition, EAA and its local chapters can also provide pilots and builders a lot of information on constructing and safely flying amateur-built aircraft. Help is available for the asking. Needless to say, every first flight should be preceded by the best preflight the pilot has ever done. Crossed control cables can ruin the best pilot's day.

For more information on building and testing home-built aircraft, interested builders can contact their local FSDO, MIDO, or EAA chapter. They will all be glad to help anyone interested in building and testing amateur-built aircraft. EAA Headquarters also sells a 45-minute video titled *Building Your Own Aircraft, How to get Started*. The video provides some good ideas and suggestions for prospective builders to consider before buying their first kit part. EAA's telephone number is 1–800–843–3612. ■

A TALE OF THREE BROTHERS

The following brief story illustrates a few of the construction and certification steps that Mr. Kaye (Boots) Lenn and his two brothers, Edwin and Wayne, of Culpeper, VA, went through in building and certificating their amateur-built Wheeler Express *in the spring of 1993. Like many others last spring, they too were trying to complete their aircraft in time for Sun 'n Fun 1993. Their story shows some interesting (typical?) problems or challenges that can develop between the time a decision is made to build a particular aircraft and its certification. Their story also highlights some of the important safety points that other builders may want to consider when building their own aircraft.*

Building an Aircraft

With an aviation background that dates back to World War II, and with one completed homebuilt aircraft project behind them, the Lenn brothers decided to build a *Wheeler Express* after Oshkosh 1988. After visiting the aircraft's factory in Washington state to get a feel for the company and looking at the aircraft's construction manuals, they bought their first two aircraft kits in October 1988. After starting to work on the kits, they discovered the construction manuals they had been impressed with at the factory were not as complete as they had thought. They said the factory kept revising the manuals during the project. This problem was eventually resolved.

They also had problems getting parts. "Parts were always slow in coming," Kaye said. To help others avoid similar problems, the brothers said that builders should check out what type and level of factory support is and will be available during a long term project. They pointed out that if someone is building a kit aircraft and if money and storage space are no problem the builder might want to buy all of the aircraft's kits at one time. Buying the complete aircraft kit package eliminates the possibility that required kits might not be available when needed in the future.

While waiting for additional kit parts in late 1989, the first prototype *Wheeler Express* crashed in Long Beach, CA. "We were a little hesitant to proceed," Kayé said. In their search for what caused the crash, the brothers wrote the Long Beach newspaper for details of the crash. According to the newspaper article and its photographs they were sent, the aircraft's engine apparently seized right after takeoff and the plane hit a house. "It was quite dramatic the way the aircraft was torn up, but the pilot and passenger just walked away from the fiery crash. By the time the emergency crew arrived, the pilot and passenger had exited the wreckage and were sitting on the curb with only minor injuries. It made us feel good that the aircraft could take such a beating and the passengers could survive," Kaye said.

Then in 1990 with their fourth kit on the way, the second factory aircraft crashed in Wyoming with three fatalities. The aircraft had been on its way to Oshkosh for the EAA convention. Kaye said the NTSB would later attribute the cause of the crash of the 200 MPH aircraft to pilot error. The crash had a major impact on the brothers' project. The publicity, legal, and business concerns surrounding the two crashes of the factory aircraft caused the factory to shut down. "We were a little apprehensive that we would not be able to finish because of a lack of parts. We stopped working for almost a year because of the lack of parts," he said.

Then in 1991, a group of about 40 *Wheeler Express* builders, a few at a time, starting going to the Tacoma Narrows Airport (WA), the home of the *Wheeler Express* factory to try to build the third factory demonstrator. Slowly kit parts became available. Finally, in March 1993, the Lenn brothers certificated their aircraft. Since then they have flown it about 60 hours.

Although this article is a short summary of a completed amateur-built aircraft project that spanned several years, we think the Lenn brothers did several important things during their project. First they compared various models and made their selection decision based upon their skills, experience, and desired aircraft performance. Then they got involved in what was happening to their aircraft's design both before and after they decided on which aircraft to build. They visited the factory, met and talked with other builders, and kept track of the prototype aircrafts' accidents. They searched for information about the accidents and made decisions regarding completing their aircraft based upon that information. They even went to North Carolina to fly for more than an hour in a completed *Wheeler Express* to learn how the aircraft flies. And when it came time to certificate their aircraft, they worked closely with their local FAA airworthiness safety inspector. Throughout their project they had kept detailed parts and kit receipts, complete construction records, and a photographic scrapbook showing the project's history. Their record keeping and documentation efforts made it easy for the FAA Airworthiness Inspector from the Washington (DC) Flight Standards District Office to certificate their aircraft.

When asked if they had any advice for anyone thinking about building an aircraft, the Lenns' had several suggestions. First they believe pilots thinking about building an aircraft should determine why they want to build an aircraft. Their point is if a pilot wants to fly *now*, then that person should take the money he or she will spend on building a homebuilt aircraft and buy a good used aircraft. If a pilot enjoys building things, wants to learn more about aircraft, and is in no hurry to fly the completed homebuilt, then they said a homebuilt may be the right choice. They said a good kit aircraft will probably cost as much if not more than a good used production aircraft with similar performance. An aircraft built from plans will probably take much longer than a kit project.

Then they pointed out there are many types of construction materials available for building an aircraft. From the traditional wood or metal tubing and fabric to metal to space age composite or any combination, each material has its advantages and disadvantages. They said there are aircraft with similar performance specifications available in each type of material so a builder is not limited to a certain type of material just to get a certain type of performance. The key they said is for each builder to look at all of the various designs, talk to other builders, compare the various options and then decide what aircraft design best meets his or her needs and ability. They also said some kit manufacturers offer starter kits for new builders so that they can test their skills. The starter kit provides a relatively inexpensive way for new builders to see if they can do the type of work needed to build the aircraft. The starter kit item built will be used in the construction of the aircraft so the project is not a waste of time or money.

Finally, they said builders should start their projects as young as possible because projects often take longer to complete than initially planned. They said older pilots may run out of 'runway' [life] before they complete their projects.

When asked if they would do it again, they all said yes. They did say though that building the aircraft was more enjoyable than flying it. The comments of true builders.

THE PAPER AND INK USED IN THE ORIGINAL PUBLICATION MAY AFFECT THE QUALITY OF THE MICROFORM EDITION.

Freedom "Flying"

The Statue of Freedom "flies" from the Capitol dome with a little help from a Sikorsky Skycrane. The insert shows the rigging used to help Freedom "fly" safely.

by Louise Oertly, *Associate Editor*

Today, lifting a 15,000 pound load to the top of a building is no big deal especially with our modern technology and external load-carrying helicopters. But after reading the preceding article, I started wondering about our "Famous Flyer's" history and her first flight 130 years ago.

In the early 1850's the U.S. Congress decided that the Capitol's small wooden dome sheathed in copper was unsafe. It was also out of proportion with the extensions on either side of the main building. When Architect of the Capitol Thomas U. Walter's offered a design for a much larger cast-iron dome topped by a monumental statue, Congress approved and commissioned its construction in 1855. The task of designing the statue was given to Thomas Crawford, who was in Italy working on other neoclassical sculptures for the Capitol. His proposal was for an allegorical figure of "Freedom triumphant in War and Peace."

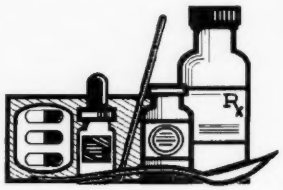
The Statue of Freedom stands 19 feet 6 inches tall on a cast-iron globe encircled with the national motto, *E Pluribus Unum*. She is depicted as a classical female figure robed in flowing draperies which are secured by a brooch inscribed "U.S." In her right hand she holds a sheathed sword and in her left a laurel wreath of victory and the shield of the United States with thirteen stripes. Her headgear proposed in an earlier design was a liberty cap—the emblem of freed slaves in Ancient Greece and a symbol of liberty during the American and French Revolutions. However, Secretary of War Jefferson Davis, who was in charge of the project, objected to that idea. In a January 15, 1856, letter he wrote, ". . . its history renders it [the cap] inappropriate to a people who were born free and would not be enslaved." The sculptor conceded to his suggestion that a helmet be used instead and replaced the liberty cap with a crested Roman helmet encircled by stars and topped by a crest composed of an eagle's head, feather, and talons (this crest leads many to believe the statue is a Native American). Tragically, Crawford would never see his statue crowning the U.S. Capitol. He died in 1857 at age 44 before the plaster model left his studio in Rome.

In the spring of 1858 Freedom finally left Italy. However, her transport soon proved to be unseaworthy. The small ship had to stop in Gibraltar to repair leaks and later in Bermuda where her journey ended. The model's six crates were put in storage until another ship could be arranged. It was nearly a year later, March of 1859, when all six crates finally arrived in Washington, DC, via New York. In 1860 the plaster model was sent to Clark Mills' bronze foundry located on the outskirts of Washington where the casting of the five main sections of the Freedom would begin.

Progress on the new Capitol dome was slow. Plagued by financial problems and the outbreak of the Civil War, it looked as if the whole project would be stopped. Secretary of War Edwin Stanton argued that the iron and manpower would be better utilized elsewhere. As it was, the Capitol building had become a barracks and after the Second Battle of Bull Run and then Antietam (August and September 1862) it was pressed into duty as a hospital. After Freedom's bronze casting was completed in 1862, her fate was still undecided. She was assembled and for nearly a year displayed on the east grounds of the Capitol silently watching the troops around her. In 1863 President Abraham Lincoln finally decided that the Capitol's construction would continue. He said, "If people see the Capitol going on, it is a sign we intend the Union to go on."

Continued on page 21

Medical Stuff



Say Again?

by Bruce Edsten
APPM, Louisville, KY

Does the tower controller usually sound like a kid with a mouthful of marbles? Do you always have to ask Clearance Delivery to repeat everything after, "ATC clears"? Do you miss Center's calls a lot, even though the radios are turned to max volume? Maybe it's time to run the radios into the shop for a little look-see, huh? Well, that may help, but the trouble may not lie with the equipment—the airplane's equipment, that is. Even though you may have been freshly blessed by your local, friendly, neighborhood Aviation Medical Examiner (AME), *you* could be the one with the problem.

Your hearing may not be bad enough to bust the medical, but a significant hearing loss, particularly in certain frequency ranges, may have occurred. How does this happen? Exposure to high levels of noise, that's how! Those of us in the bifocal set may have acquired our loss of audio acuity over many years. Some younger types may have picked up their affliction a little more quickly, especially if they are heavy metal music fans. (Judging from the sound level heard outside the auditorium, I'd guess that ONE Grateful Dead concert would produce a measurable hearing loss in most people!)

All kidding aside, much of the aviation business exists in a pretty noisy environment, and if you spend any significant amount of time in and around aircraft, it is almost certain to affect your hearing. Is this some new discovery? Nope! How come people intentionally, knowingly, put themselves into this hazardous environment, then? Good question, and one without any simple answers. Maybe everybody just accepts this as an occupational hazard. Perhaps it's economics. A regimen for protection from and/or reduction of noise hazards can sometimes be quite expensive. Perhaps the student in a Cessna 150 figures his or her exposure will not be enough to worry about, but even an occasional hour of instruction can make a difference. Could be it's just macho, too; the old, it-can't-happen-to-me syndrome, right? Well, folks, it can happen, and it does happen, so we all need to think about it.

What can we do about it? Reducing the noise level in the environment is probably beyond the control of most of us. Out on the ramp, there is nothing you can do at all. Inside the airplane, it's a bit easier. Just about any airplane can be quieted down by installing sound proofing material and devices. Things like thicker windows, foil-backed foam batting, improved door and window seals, etc., are readily available but not cheap. And, what if it's not your airplane?

Realistically, most of us won't be able to materially affect the environment, so our only choice is protection *from* that environment. My first encounter with hearing protection was in the Army. Hanging around a *Huey* is a mighty fine way to get a big time hearing loss, so we all got helmets. Inside were some heavy-duty ear cups with speakers in them, and the whole thing seemed like it protected the head pretty well. I say "seemed" because it still allowed some damage to occur. Now, you would think that the military would have nothing but the best, and that these helmets would have saved my ears, but after three years in Army Aviation I had a fairly substantial high-frequency loss. I hate to think what would have happened without the helmet.

During the next 11 years, I got all my tickets and instructed for about 4,000 hours, all without any protection. No doubt that hurt me. I spent the next couple thousand hours with a commuter airline in very noisy cockpits, and I quickly opted for a good headset. Since we had no intercom, however, a lot of time was spent with one ear cup half off. More damage! Eventually, I'll probably need a couple of those itty-bitty hearing aids.

So, what's available today? Check the ramp at your average airline-type airport. Most of the folks out there will have ear protection consisting at least of a headband with pointed plugs on the ends, which will block out some of the racket. In almost all cases, the hearing protectors with cups that go over the ears will provide better protection, however. These are the ones that look like headphones and are frequently called "Mickey Mouse Ears." Several kinds of earplugs are available, also. Some, like the cylindrical foam type, are quite inexpensive.

All of the above are somewhat impractical if you need to listen to the radio or other occupants of the aircraft, though. Some of the earplugs reportedly do not cut out much in the range of normal speech, but they may not be terribly effective at blocking the harmful noise, either. Best bet? Head phones!

Oh, boy. Here it comes: Head phones = BIG BUCKS! No, not really. Of course, if you really want to, you could blow a major bundle on a set of head phones, but it simply isn't necessary. Like everything else, of course, performance carries a price, but a quite serviceable headset can be had for less than the price of an hour of dual.

What do you want to look for? Probably comfort should be high on your list. The best rig in the world won't be worn much if it weighs a ton or squeezes your head like a C-clamp! Next is noise attenuation, which is usually shown in dB or decibel rating. Most head phones will be rated around 15–20 dB at least, and many are higher. You may have to compro-

mise a bit, trading comfort for dB ratings, or vice versa. You must also be sure that the rig is compatible with your radio set-up, particularly if you are including a boom mike. Your radio shop can be a big help here.

Of course, any of these headsets will help by putting a couple of little speakers virtually on top of your ears. Aircraft speakers, especially original equipment in light planes, leave a lot to be desired even when new. After a few years of exposure to the elements, they are even less efficient, and the headset might be a worthwhile investment for this reason alone.

If you have a few more rubles to spare, an intercom is a truly great investment. Again, features and performance can drive the price up, but reasonably good units are quite affordable. Generally, these rigs allow you and up to three others to converse in normal conversational tones without missing any radio calls. These rigs can be portable or fixed and may be powered by an internal battery or plugged into the cigarette lighter. Permanently installed ones could be connected to normal ship's power, of course. The benefits of this arrangement are obvious: noise attenuation without any loss of communication inputs. As a result many flight instructors are now using a portable system consisting of the intercom box and two headsets with boom microphones. They take the whole rig with them to each training aircraft they use, and most students I've talked to really love it.

At present, the pinnacle of hearing protection technology is "noise cancellation." In these systems a microphone picks up the noise and sends the signal to a computer, which analyzes it. The computer then develops a counter-signal designed to "oppose" the input signal and sends it out through an amplifier and speaker. I have seem some demonstrations of this technology in controlled situations, and it is most impressive. And it's cheap, too, right? Wrong. It also doesn't work quite as well in headsets as it does in big, fixed installations, but it does work.

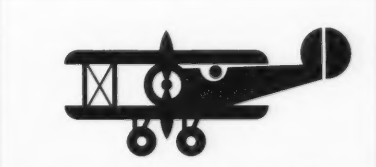
So, assuming that Ed McMahon just brought you one of those sweepstakes checks, you could go out and invest in one of the new noise canceling headsets and get some really great protection. (Some of these systems retail for over $1,000!) Now that there are three or four manufacturers of noise canceling headsets in the market, the prices will come down, and if you dig through that big yellow classified newspaper (you know the one I mean), you can find some of them for about half that figure. It might well be worth it, too. Even at full retail, it could be worth the extra dB protection if you have an especially noisy environment to deal with.

In any case, if you spend a lot of time in airplanes, you could be asking for trouble if you don't protect your ears!

Say again .... ■

This article orginally appeared in the March 1993 issue of the Louisville FSDO's Accident Prevention Program Newsletter.

IN THE **HANGAR**



Hooked in Nashville

by Brian M. Jacobson

The weather conditions for the flight from Houston back to Providence, RI, were fair with lots of humidity pumping its way from the Gulf of Mexico to the Northeast. We flew on instruments in the old DeHavilland *Dove* to Nashville where we had planned a fuel stop. Henry, a recent instrument pilot, did the navigating and radio work, and I flew.

Just before reaching Nashville we were talking to Memphis Center, and approximately 30 miles from our destination the controller handed us off to Nashville Approach Control and gave us the correct radio frequency.

"Memphis Approach, DeHavilland Six Three Zero Hotel at five thousand," Henry called. The controller answered, "Cherokee Six Three Zero Hotel, Nashville Approach. Maintain five thousand and present heading for vectors to the final for runway two zero right."

Henry and I looked at each other and shrugged. We figured the controller was busy and got our type wrong.

"Cherokee Six Three Zero Hotel, Nashville, turn left 040 and maintain 4,000 feet."

"Memphis," Henry said, "Three Zero Hotel would like two zero left for landing today."

"Cherokee Six Three Zero Hotel, Roger. Will keep you informed."

It went on for quite a while that way. Finally Henry decided to straighten the controller out on the type of aircraft we were flying.

"Memphis Approach be advised that Six Three Zero Hotel is a DeHavilland *Dove*. We are not a Piper *Cherokee*."

The controller's drawl came back loud in our headsets.

"Tell ya what, Six Three Zero Hotel. I'll make ya a deal. You stop calling me Memphis, and I'll stop calling you Cherokee."

Henry's face turned beet red, and we both laughed. He put his thumb in his mouth simulating a hooked fish. After that the correct terminology was used on both sides of the mike.

In the years since I have been to Nashville many times and always remember the first time I landed there. It is interesting to note that the people of Nashville are always friendly and happy to see those who visit their city for whatever reason they may have. They are rightfully proud of their city and will let a wayward visitor know that should he confuse Nashville with Memphis.

STATUS OF THE FAR

As promised, the *FAA Aviation News* is publishing an annual listing of the Federal Aviation Regulations (FAR) in loose-leaf form and their latest changes and prices. Many of the FAR are reprinted commercially, some in book form. It is important to keep in mind that the rules are amended often in some cases, and existing provisions may be nullified or changed by this process unless they are updated continuously. Commercial publications may or may not provide updates.

The FAR are sold in two ways by the Superintendent of Documents—subscription and single sales. When you order a subscription, for which there is an annual change, the changes will be sent to you automatically as they are issued. Single sales are a different matter. The changes to these parts are infrequent, and no direct notice of a change is sent out. Therefore, you must order and pay for each change as it is issued.

Another way of obtaining the FAR is to purchase the bound volumes of the U.S. Code of Federal Regulations. These three volumes of Title 14 contain the Federal Aviation Regulations of interest to most airmen:

Parts 1–59	(SN 869–017-00042–6)	$25.00
Parts 60–139	(SN 869–017-00043–4)	$22.00
Parts 140–199	(SN 869–017-00044–2)	$11.00

These volumes are only updated annually, so the latest changes would have to be obtained from another source.

The following pages contain the current status and price list for the loose-leaf FAR. Color highlighting indicates those rules considered of special interest to general aviation pilots. To order any of the FAR parts, send check, money order, or credit card number to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402–9325. Add a 25% charge for foreign mailing on the single sale items. Remember to use the stock number.

Parts Sold on Subscription Service

Part	Title	Code Letter	Price Domestic	Price Foreign	Changes Issued
1	Definitions and Abbreviations	FA001	36.00	45.00	
11	General Rule-making Procedures	FA011	30.00	37.00	1
13	Investigative and Enforcement Procedures	FA013	30.00	37.50	12
21	Certification Procedures for Products and Parts	FA021	38.00	47.50	—
23	Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes	FA023	36.00	45.00	—
25	Airworthiness Standards: Transport Category Airplanes	FA025	32.00	40.00	1
27	Airworthiness Standards: Normal Category Rotorcraft	FA027	35.00	43.75	
29	Airworthiness Standards: Transport Category Rotorcraft	FA029	36.00	45.00	25
33	Airworthiness Standards: Aircraft Engines	FA033	27.00	33.75	9
36	Noise Standards: Aircraft Type and Airworthiness Certification	FA036	26.00	32.50	—
43	Maintenance, Preventive Maintenance, Rebuilding, and Alterations	FA043	32.00	40.00	1
45	Identification and Registration Marking	FA045	33.00	41.25	—
61	Certification: Pilots and Flight Instructors	FA061	38.00	47.50	—
65	Certification: Airmen Other Than Flight Crewmembers	FA065	36.00	45.00	—
71	Designation of Federal Airways, Area Low Routes Controlled Airspace, and Reporting Points, Jet Routes, and Area High Routes[3]	FA071	29.00	36.25	2

Parts Sold on Subscription Service

Part	Title	Code Letter	Price Domestic	Price Foreign	Changes Issued
91	General Operating and Flight Rules	FA091	47.00	58.25	2
	*Preamble		free		
93	Special Air Traffic Rules and Airport Traffic Patterns	FA093	36.00	45.00	2
103	Ultralight Vehicles	FA103	12.00	15.00	—
108	Airplane Operator Security	FA108	29.00	36.25	10
121	Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft	FA121	60.00	75.00	—
125	Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More	FA125	25.00	31.25	—
127	Certification and Operations of Scheduled Air Carriers With Helicopters	FA127	35.00	43.75	—
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135	Air Taxi Operators and Commercial Operators	FA135	45.00	56.25	—
137	Agricultural Aircraft Operations	FA137	12.00	15.00	—
139	Certification and Operations: Land Airports Serving Certain Air Carriers	FA139	29.00	36.25	—
145	Repair Stations	FA145	34.00	42.50	—
150	Airport Noise Compatibility Planning	FA150	22.00	27.50	—
159	National Capital Airports	FA159	17.00	21.25	—
161	Notice and Approval of Airport Noise and Access Restrictions	FA161	29.00	36.25	—

* Not included with subscription. For a particular FAR Part 91 preamble, write to DOT, M–443.2, Washington, DC 20590.

Parts Sold on Single Sale Basis

Part	Title	Price[1]
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49	Recording of Aircraft Titles and Security Documents (SN 050–007–01021–4)	2.75
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67	Medical Standards and Certification (SN 050–007–00999–2)	3.50
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	Change 1 (050–007–00326–9)	2.00
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95	IFR Altitudes[3] (SN 050–007–00277–7)	1.75
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97	Standard Instrument Approach Procedures[4] (SN 050–007–01002–8)	1.75
99	Security Control of Air Traffic (SN 050–007–01022–2)	4.00
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	Change 3 (050–007–00900–3)	2.75
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Parts Sold on Single Sale Basis

Part	Title	Price[1]
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[1] Add 25% for foreign handling.

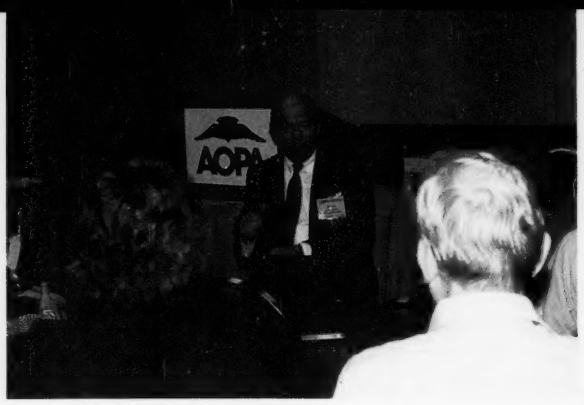
[2] Due to their length, complexity, and frequency of issuance, individual Airworthiness Directives (AD's) are published separately in the Federal Register. Microfiche or paper copies of the AD's in summary form are sold by DOT/FAA for the Superintendent of Documents. Ordering information is in Advisory Circular 39–6P, "Announcement of Availability—Summary of Airworthiness Directives," (free from DOT, M–443.2, Washington, DC 20590) or call 405–680–6901 for an order form.

[3] Due to their length, complexity, and frequency of issuance, individual airspace designations, airways descriptions, restricted areas, jet route descriptions, and IFR altitudes are not included in the publication of these basic Parts. Such descriptions are published in the Federal Register and depicted on appropriate aero-nautical charts. Aeronautical charts can be obtained from the Distribution Branch, N/CG33, NOS, NOAA, Riverdale, MD 20737–1199.

[4] Standard Instrument Approach Procedures are published in the Federal Register by reference to FAA documents which are available for examiniation in the Rules Docket (AGC–10) and the National Flight Data Center, FAA Headquarters, Washington, DC, and at the appropriate FAA regional offices and Flight Inspection District Offices. These Instrument Approach Procedures Charts can be obtained from the Distribution Branch, N/CG33, National Ocean Service, NOAA, Riverdale, MD 20737–1199.

[5] Formerly sold as subscription items. At time of magazine publication the price and stock numbers were not available.

* This change incorporates Amendment 75–5 which removes and reserves Part 75, effective December 1991.



Another Step Toward Rebuilding

Continued from page 1

Technology

"Technology will act on us [the FAA] whether we like it or not," Hinson said, "It forces us to change." He spoke specifically of the recent FAA approval of non-precision GPS approaches. The switch-over to GPS "will be gradual evolution with a phase-out of existing ground-based systems." FAA has yet to determine what will be the back-up for GPS, but "we're working hard on that and other concerns with GPS." Until such time as approved receivers are available, Hinson asked his fellow pilots, "Please don't use your handhelds for instrument approaches. Right now it's illegal, but more importantly, you might get hurt." FAA approval of receivers is moving along, and "we're getting to the point where soon you'll be able to make GPS approaches safely with standardized equipment." He added, "GPS is a marvelous tool for general aviation."

General Aviation and the Kansas City Conference

Hinson began to talk about general aviation by listing some positive changes under the current administration; namely, an improving economy and the repeal of the luxury tax. He reiterated the "General Aviation Policy Statement" he signed as one of his first official acts as FAA Administrator (November/December 1993 *FAA Aviation News*) and the redraft of the General Aviation Action Plan as a result of a precedent-setting meeting between general aviation industry interests and the FAA last September. (See "Rebuilding General Aviation" in the November/December 1993 *FAA Aviation News*. If you missed it, call (202) 267–8017 for a copy.)

Next came the awaited response from the FAA to the recommendations presented at the Kansas City Conference. The Administrator announced that he had directed FAA Associate Administrator for Regulation and Certification Anthony J. Broderick to form a special general aviation team. "I have asked this team to revise the General Aviation Action Plan to incorporate my policy statement and to incorporate and develop strategic goals for *implementing the recommendations* [emphasis added] developed by the Kansas City group. The revised plan is to be completed by March 1, 1994."

The administrator went on to announce that, "in response to your expressed concerns about the lack of replacement parts for your aircraft, the FAA will continue to pursue the definition of a parts policy. . . by July 1, 1994."

Next, he announced, "In order to fully implement the new Primary Category rule, I have asked [Mr.] Broderick to expedite the publication of a new policy expanding owner maintenance in over 20 areas for operators of primary category aircraft. . . by no later than February 1, 1994 or the date the first production primary aircraft is available, whichever comes first."

"Next month [December 1993]," he continued, "we will implement a one-year program at the Denver Flight Standards District Office to test a new, proactive education compliance approach to Accident Prevention and safety compliance. If the techniques are successful, we will implement the program nationwide."

Finally, he concluded, "I am placing a high priority for the evaluation of AOPA's petition to extend the term for third-class medical certificates from two to four years. I also will seek this same high priority for the Experimental Aircraft Association's petition to replace the third-class medical for recreational pilots [with self-certification]."

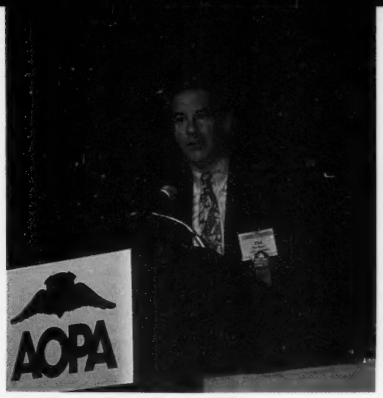
Hinson then broke away from his prepared speech again to talk pilot-to-pilot. "In 1979 and 1980 when I was the owner of a Beech distribution center, general aviation delivered 17,000 airplanes. In 1993, we're going to deliver less than 700. General aviation has had difficulty staying alive, and the causes for that have been varied. The market will come back—I am certain of that—but it will be in a different form from that of the 1970's."

Customer Service and Safety Issues

"FAA has taken a big step forward in incorporating customer service in its actions," Hinson said. "We will still regulate and enforce when we have to, but we all must be professionals about it. Also, we ought to be looking at anything that will safely alleviate your costs."

Hinson then began to talk about how every morning he receives preliminary reports of all the accidents and incidents that have occurred in the preceding 24 hours. He has noted that "general aviation fatalities have been slowly and steadily getting better, but I don't like to see every morning that someone has died in a general aviation aircraft." The aircraft, he notes, are highly reliable—contrary to the public's

FAAers Obie Young (Left) and Larry Randall.



Phil Boyer, President, AOPA.

belief. "What we find after investigating is that 90% are mental errors—in other words, preventable. Think about that when you fly home. The key to safety is right here," he said, pointing to his head.

"An old instructor of mine," he continued, "summed it up this way: 'The airplane flies in two directions. If you don't like where you're going, you can go back to where you were.'"

Every pilot in the room had heard that same thought expressed in a multitude of ways, and it was sobering coming from an Administrator who could so easily relate to his audience.

Hinson concluded the formal portion of his speech by promising to "use the assets of the agency to further general aviation. After all, you are the customer."

Q and A

The Administrator next fielded questions from the floor and ones that AOPA had video-taped from pilots unable to attend.

"The FAA is too airline-oriented. What can you do about that?" asked one pilot.

"I quarrel with that conclusion," answered Hinson. "We in general aviation just haven't done a very good job of telling our story. But that will change."

"How will we pay for privatizing ATC, if that happens?" asked another.

"We could use a portion of the current ticket tax or issue bonds," responded Hinson. "There is a committee within FAA looking at a number of such issues. Other countries, such as Germany, have user fees, but, then, there's not much flying in Germany. They only have nine control towers."

"What's the FAA going to do about communities closing airports?" asked another pilot.

"This year the FAA will provide money to help in converting six military airports to civilian use. That's not much, but it's a start. Basically, closing airports is really a local issue, and the grassroots of aviation have to make themselves heard at that level. Tell general aviation's story, clear up the misconceptions about safety, and the FAA will be right there with existing rules that preclude the capricious closing of airports," Hinson replied.

"Real Pilots. . . Real Airplanes. . . Real Fun"

His speech wasn't the only thing the Administrator put aside. The opportunity to be among people he considered his peers was not one to be passed up. He set aside his schedule and wandered among the vendor booths in the exhibition area, stopping to chat with vendors and attendees and answering questions. He seemed reluctant to leave and opted to stay and spend more time with those real pilots.

The reaction to this new Administrator and his taking on the revitalization of general aviation as a major project for his tenure ("I'm in for the full four years," he said.) has been almost overwhelmingly optimistic. For those who pre-supposed that the recommendations of the Kansas City Conference would be swept under some vast, bureaucratic rug in Washington were wrong. "Just remember," Hinson said, "this is still a bureaucracy and one in the midst of transition. Things may not happen as quickly as you and I want them. But they will happen."

The word of another bureaucrat? No, the word of a pilot. ■

Freedom "Flying"

Continued from 15

It was near the end of 1863 before dome construction was ready for installation of the statue. Using the scaffolding which rose through the center of the Rotunda (see diagram), each section of the statue had to lifted by a steam hoist and a hand-cranked winch and then assembled. At noon on December 2, 1863, the last section, Freedom's head and shoulders, was lifted to her perch 288 feet above the Capitol's east front plaza and bolted in place. Her completion was announced by a 35-gun salute (one for each state in the union including the states that had seceded) and the answering guns from the 12 forts ringing Washington.

For the next 130 years the Statue of Freedom stood guard atop the U.S. Capitol facing the ravages of time and the environment. However, the day finally came when extensive restoration of Freedom and her cast-iron pedestal became necessary. Thankfully, today's technology allowed a relatively painless way to get the statue on the ground and back on top again as was told in the preceding pages. Which leave me with the intriguing thought—imagine it is 1863 and someone suggested that it was possible to move the whole statue (remember it weighs 15,000 pounds) within a matter of minutes. The person would most likely have been declared a candidate for the new Government Hospital for the Insane (another structure designed by Architect of the Capitol Thomas Walter, and now known as St. Elizabeth's) or a storyteller rivaling Jules Verne. ■

Editor's Note: *We want to thank the Architect of the Capitol's office for information and photographs for this article and the Surratt House Museum in Clinton, MD for the use of its library for information on Lincoln and Washington, DC, during the Civil War. The Architect of the Capitol's brochure,* The Statue of Freedom, *the* In Commemoration of The Bicentennial of the United States Capitol 1793–1993 *program, and the various releases provided by the Architect's office were used in preparing this article.*

FLIGHT**FORUM**

Question. *The new classes of airspace, a, bee, cee, dee, e, and gee, all sound pretty much the same; especially, during congested times in the cockpit, on the edge of ATIS reception, or busy ATC periods. Why can't we use the phonetic alphabet to avoid confusion?*

Answer. We can. FAA Order 7110.65, *Air Traffic Control,* paragraph 2–85, instructs controllers to use the ICAO pronunciation of numbers, and as necessary to clarify individual letters; paragraph 2–90, Airspace Classes states, "Classes A, B, C, D, E, and G airspace are pronounced in individual letter form. Only use ICAO phonetic pronunciation of letters to clarify the class of airspace. Examples:"Cessna 1–2–3 Mike Romeo cleared to enter Class B airspace." "Sikorsky 1–2–3 Tango Sierra cleared to enter New York Class Bravo airspace." Similar guidance can be found in paragraph 4–37 of the *Airman's Information Manual.* The criticality of pilot/controller communications demands complete understanding by all parties. Regardless of what method the controller uses, you are authorized to use the geographic and phonetic designators during your request and again during your acknowledgement. For example, you call San Antonio approach for clearance through the Class C, "San Antonio approach, Cessna two-three-four-six-Victor fifteen miles east, request clearance through the Class Charlie westbound at two-thousand five-hundred." San Antonio responds with: "Cleared through the Class C." You may reply, "Roger, Cessna four-six-Victor is cleared through the San Antonio Class Charlie." Thanks for flying safe.

Question. *What is the purpose of a Class E extension to a Class C or D surface area? I heard that if the airport in the Class D was IMC, then the Class E extension is also IMC and radio communications are required. Is this correct and how would the pilot of an aircraft without radios be able to comply?*

Answer. A Class E extension to a higher class of surface area airspace is simply an extension designed to contain IFR arrivals in controlled airspace. If, when executing an instrument approach, the pilot is authorized to descend below 1,000 feet AGL outside of the basic surface area, an "arrival extension" is created. By making these extensions Class E, we are containing the instrument approaches in controlled airspace and making the cloud clearance and flight visibility provisions of FAR § 91.155 apply without establishing a communications requirement.

Which leads to your second question. No, the Class D airport being IMC does not automatically make the Class E portion IMC! What it does do is make FAR § 91.155(c) and (d) applicable. FAR § 91.155(c) states, "Except as provided in § 91.157, no person may operate an aircraft *beneath the ceiling* under VFR within the lateral boundaries of controlled airspace designated to the surface for an airport when the ceiling is less than 1,000 feet. FAR § 91.155(d) states, "Except as provided in § 91.157, *no person may take off or land an aircraft, or enter the traffic pattern* of an airport, under VFR, within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport, (1) Unless ground visibility at that airport is at least 3 statute miles; or (2)If ground visibility is not reported at that airport, unless flight visibility during take off, landing, or while operating in the traffic pattern is at least 3 statute miles."

What does all that legalese mean? If you are flying through the Class E airspace at or above 1,000 feet AGL AND are able to maintain the required cloud clearance of 500 feet below, 1,000 feet above, and 2,000 feet horizontal AND have at least 3 statute miles of flight visibility, then the official weather at the airport meets basic VFR requirements. Again, there is not a communications requirement for VFR flight in Class E airspace. However, if you are flying beneath an official ceiling that is less than 1,000 feet, a special VFR clearance is required for flight within the surface area, including the Class E extension. If the official visibility is less than 3 miles, a special VFR clearance is required for take off, landing, or while operating in the traffic pattern. Thanks for the complex question, we hope our answer, while lengthy, is helpful.

FAA AVIATION NEWS welcomes comments from its readers. We may edit letters for style and/or length. We will select one representative letter from those on the same topic for publication, and because of our publishing schedule, responses may not appear for several issues. We will not print anonymous letters, but we will withhold names or send personal replies upon request. Address: Editor, FAA AVIATION NEWS, AFS–810, Washington, DC 20591.

• Computer Catch

Although I enjoyed your recent article on Embry-Riddle, the caption on the lower photograph on page 4 (March 1993 issue) is a little misleading. Everyone in the picture is playing a video game called TRACON. I know, since I am a TRACON addict (and a pretty good one, if I do say so myself). The student in the foreground is wearing a dismayed expression because his screen is displaying the dreaded red box that indicates that he has just crashed a couple of airplanes. Oops!

Bennett E. Taber
San Francisco, CA

Thanks for the catch. We just used the slide caption that Embry-Riddle provided and didn't notice what was on the screen.

• Simple ELT Check

In your July/August issue, your article concerning ELT's and the number of false signals that are transmitted caused me to put my thinking cap on. I feel that there can be a very simple cure for the problem.

I fly a Beechcraft Baron, *always IFR and generally the cockpit is too busy to monitor 121.5 on a regular basis. When I reach my destination, I, like most, am running short on time, and at large airports everything is moving pretty fast so we can't always check 121.5 before shut down.*

I suggest a small, very inexpensive radio receiver that would remain on at all times, for all aircraft, FBO's, towers, or other airport facilities. With this very inexpensive radio a pilot would know without checking when his ELT was transmitting, also an airplane on the ramp or in the hangar would be very easy to locate.

A radio receiver similar to the Radio Shack weather band (retails for around 20 bucks) with the 121.5 frequency might be a very easy solution to a very costly problem. If this receiver was available I would have one in the aircraft and also one at home.

Gary F. Jones
Paris, TN

Your idea sounds great. Mr. Jones has already contacted Radio Shack-Tandy Corporation about his idea. We will wait and see what happens. As long as the radio meets FAR § 91.21, Portable Electronic De-

vices, requirements when used in an aircraft, it could save rescue people, especially Civil Air Patrol volunteers, a lot of wasted effort on needless ELT searches. Although the FAA cannot endorse a particular company or product, this idea would be a great help in reducing the number of false ELT signals.

There are two other items that pilots and aircraft owners might want to consider. One is the installation of a remote ELT switch in the cockpit for those units that are designed for one. The switch allows a pilot to turn a unit off after a flight if the unit was inadvertently activated. The only problem is the pilot must remember to arm the unit before takeoff or after an ELT test. If not armed, the unit will not transmit in case of an accident. The other item is the cockpit use of activation monitors such as the aural or visual monitor explained in Technical Standard Order TSO-C91a, Emergency Locator Transmitter (ELT) Equipment, which sets the standards for ELT equipment. The monitors indicate when the unit is transmitting.

Thank you for your suggestion.

• Koch's Komments Kontinued

I noticed in the pictures accompanying the article, Koch's Komments, (page 28 of the July-August 1993) that there are no parachutes as required by FAR § 91.303(c). This operation could not come under the rules of flight instruction as the purpose of the flight was photography.

Does the FAA consider the photographer a crew member, or is the FAA exempt from their own rules.

Chuck Jamieson
Metairie, LA

According to Mr. Koch, the flight met the appropriate rules when the flight was made. As a matter of information, although the FAA chooses to operated its aircraft, owned, leased, and rented, under FAR Part 91 rules, it, like other government agencies, could operate its aircraft as public use aircraft. FAA employees are not exempt from complying with the FAR.

• Lack of Definition

Editor's Note: The following is a verbatim transcript of the letter we received.

I'm in my tenth year as a subscriber to FAA Aviation News, *and during that span I've found the magazine informative and unique. Its uniqueness stems from its being, as it were, "official" (notwithstanding the relatively recent appearance of distended disclaimers inside the front cover): straight from the source where rules and interpretations are concerned.*

In this sense, one expects the editors to know the terminology. After all, your outfit invented *it.*

Yet in the March 1993 issue, Harold Bogin of the NWS (editor's note: National Weather Service) refers in the article "ASOS. . . ." to "Surface Aviation Observations (SAO)." I assume he's referring to the 'sequence reports" traditionally identified by the letters SA, and if this is the case, I beg to differ. "SA" has stood, for at least the twenty years I've been flying, for "scheduled airways." If you take a step back and regard the question logically, it's reasonably evident that "A" would not stand for "aviation": there's no necessity to include this word in the name of a particular report that belongs to the whole family of reports and forecasts (FT, FA, SA, UA, etc.) that are all *produced specifically if not exclusively for* aviation.

If the FAA (or the NWS) has officially changed the meaning of the abbreviation, I guess I didn't hear about it. But I suspect that instead, those closest to the source know less about their roots than one who values the ideal of expertise would hope for.

Though I can cite an official FAA source identifying "SA" as "scheduled airways" (IFR Pilot Exam-O-Gram #5, 2/71,) I've never tracked down a print reference to "UA" as other than "pilot report," which implies nothing concerning the genesis of the two-letter abbreviation. Now, however, it dawns on me that it must stand for "unscheduled airways." The hallmark of the sequence report is its hourly appearance on the weather network; the pilot report, on the other hand, is strictly ad hoc. *(Now if only someone call tell me what "FD" stands for.)*

Another terminological problem is your reference to "towered airports." The officially correct terms are controlled *and* uncontrolled. *A controlled airport will almost certainly have a tower, and if by "tower" we mean function rather than form, then the correspondence is 100%* (by definition).

But having a tower does not by itself make an airport controlled. The tower has to be on the air. A lot of towers operate only part-time, which renders their associated airports uncontrolled *for a portion (usually at night) of each and every day.*

Accordingly, the term "towered" lacks precision, unless you're talking about structures. We owe this bastard term mostly to commercial publishers, and genesis lies, I support, in an irrational discomfort with the word "uncontrolled," which is perceived wrongly by the ill-informed as connoting disorder or even chaos.

No pilot is supposed to receive an airman certificate unless he (or she) understands the explicit rules and procedures to use at an uncontrolled field; an editor of aviation material ought to know at least as much as a private pilot about such things and has no business polluting the lexicon with misleading and inexact popularisms, whether attempting to stem perceived public misperceptions or (worse) because of lacuna in his (or her) training.

There's also scant excuse for outright grammatical errors, such as lack of agreement between subject and verb. Since your disclaimer inside the front cover is likely to be reprinted a few more times, I'd suggest you correct the sentence that says "all printed material. . . are advisory." Notwithstanding the presence of "all," material *is a singular noun. (And in the sentence on the inside back cover of the May-June issue, where you employ the term "towered," the sentence reads "the entire control zone. . . were going to become Class D." It* were*? Some readers is not amused by such lapses. . . .*

Finally, I don't care for the sans serif typeface you're now using. I find the serifed font in use years ago more readable and pleasing to the eye than your current choice.

N.W. ("Nick") Miller
Redlands, CA

Thank you for being a loyal subscriber.

Regarding Mr. Bogin's article, the Automated Surface Observation System (ASOS) does generate a Surface Aviation Observation (SAO). The term was correctly used. The *Airman's Information Manual* (AIM) explains both ASOS and the Automated Weather Observing System (AWOS) and their associated reports. The term "sequence report" is communicators or briefers lingo or "jingoism" for Surface Aviation Weather Report (SA) because it was transmitted in teletype sequence format. A practice that, hopefully, will change with the advent of high speed transmission capability—perhaps we can go to clear text, tabular formats. By the way the *VFR* and *IFR Exam-O-Grams* can no longer be considered an official FAA source as the series was canceled several years ago.

Concerning routine aviation weather reports, you need to prepare for change. METAR is coming January 1, 1996. Just about the time you think you have the system figured out, the system changes.

Regarding abbreviations, you can check on the latest meanings of the alphanumeric combinations in FAA Order 7340.1. Certain combinations can have more than one meaning. In many cases, the meaning depends upon how the word is used.

When talking about weather, F stands for *F*orecast (e.g.: FD, Win*D*s and Temperatures Aloft *F*orecast; FT, *T*erminal *F*orecast; FA, *A*rea *F*orecast, etc.) and generally S stands for ob*S*ervation.

We appreciate your comments about the terms, towered, non-towered, controlled, and uncontrolled. We understand your concern for precise word usage, however, word usage changes with the times. Today, the general aviation industry is using the terms

towered and non-towered to avoid the illusion in the non-flying public's mind of chaos in the sky at uncontrolled airports. And yes, the staff of *FAA Aviation News* knows the difference between controlled and uncontrolled airports and the explicit rules for operating at both. The problem is most Americans do not. They may also be the voters controlling the fate of their local non-towered airport. They, and other voters like them, are the ones who may decide whether your local general aviation airport survives or not.

Regarding subject verb agreement, you can take heart. Both my editor and I agree with you that subjects should agree in number with their verbs, our problem is we seldom agree on the number. She *are* a tough editor.

Sorry you don't like our type style. We hope you keep subscribing in spite of it.

• How to Get Your A&P

I would like to get some reactions from your readers regarding the different ways someone can earn a mechanics (A&P) license. For those that aren't aware of the differences in the way to earn an A&P, let me explain. There are three ways to obtain an A&P: You can get it through military competency; work for a maintenance facility for 30 months; or, go to an approved school for two years. Well, it doesn't sound too bad concerning these three methods, but there is a world of difference in each of the three and therein lies my complaint.

A service man or woman who can prove to the FAA that they served as a mechanic in the military simply takes the FAA written and practical tests and that is it. The person who works in a maintenance shop for 30 months obtains a written request from his employer stating that he or she has completed the specified time and he or she takes the FAA written and practical tests.

These two methods are quite similar. In both of them you are getting paid while you are learning. You have no exams to pass throughout your maintenance career and you don't have to make up missed time on your days off.

The third method of obtaining your A&P is by far the most demanding of the three. You must pay many thousands of dollars for your mechanics school. If you arrive at class late, you must make up the time you were tardy, and only on a day off. The person that decides to attend formal school must sit in class or lab (hangar) eight hours a day, four days a week for two years. Whenever a subject is completed a test is given and you must get the FAA 70 percent or take a make up test. If you fail the make up you could be out of the course. Some instructors make their own tests. Others use some of the hundreds of FAA questions that can be obtained from the government or private sector. It is a good idea for the instructor to give the FAA questions as they appear on the government books because it affords the student a look at the questions that will be asked on the FAA exam. Some instructors change these stock questions or answers just in case you have memorized them. This is a bad practice. When the instructor was asked why he changed the question or answer, his reply was, in my test the answer is B, on the FAA exam you had better mark C. This course is most demanding and memorizing two sets of answers is uncalled for.

As I stated before, every subject in the three large manuals, General, Powerplant, and Airframe, requires a test and you must get 70 percent. Well, since you have hopefully passed all subjects with a minimum grade of 70 percent you are all set. Not so with the tricky FAA. You must take the FAA tests and get a 70 percent in all sections. Why is this in effect, when you have all ready gotten your tests in each subject and passed with a 70 percent or you wouldn't be in school.

Not only is it ludicrous to make you take the same tests twice, but to add insult to injury you have to take a practical test, and an oral exam with an FAA designated examiner. This might last two days and cost you $300. Why is it necessary for a strange person to ask you questions for two days and watch you perform maintenance tasks in the hangar when your instructor for the past two years knows more about what you can do on written exams and work in the hangar than a stranger who is going to charge you $300.

It would seem to me that the lion's share of the schooling should be performed in a hangar working on real aircraft. This is not so. Over three quarters of your schooling is devoted to classroom studies on physics, math, punching a calculator and learning many things that have no practical use to an A&P. More time should be spent with dirty hands taking components apart. Do you think that you would be qualified to time a magneto after working on only one magneto? Or, would you feel qualified to rebuild an engine, if you only took one apart? I think not.

In essence, since the first two methods of obtaining your license are so lax, it behooves the FAA to give the people who attend a school for two years some slack. There is no need for them to take the same tests twice, they should get their hands soiled in the hangar rather than working with a calculator, and when they have finished their two-year hitch in the classroom, they should not only get a diploma, they should get their license.

Brian Power-Waters XIII
Church Hill, MD

We need to correct some of your comments. No one ever said becoming an A&P was easy. In fact, some people would like to make it harder. They believe in today's hi-tech world of glass-cockpits, computerized wide-bodied jets, and composite airframes, maintenance technicians must know more now than ever. For them, the question might be, "Are the FAA's A&P certification standards too low?" We are also not going to discuss whether an instructor is teaching how to pass a test through memorization of the answers rather than teaching understanding of a process that can be applied to future situations. These issues are subjects for future articles. This article is a brief outline of how someone can obtain an A&P certificate.

Application Process

Applicants for a mechanic certificate must meet the requirements of Federal Aviation Regulations (FAR) Part 65, Subparts A and D for certification. FAR § 65.77 requires an applicant to have practical experience in maintaining airframes and/or powerplants. The FAR requires at least 18 months of practical experience for one rating. For a certificate with both ratings, the requirement is for at least 30 months experience concurrently performing the duties appropriate to both ratings. (NOTE: Practical experience, both military and civil requirements, is based on a standard 40-hour work week. A standard work week is 8 hour per day for 5 days per week which totals 40 hours per week and approximately 160 hours per month.)

An applicant can verify his/her experience for an Airframe & Powerplant (A&P) certificate by several methods:

(1) Graduate from an FAA-approved Aviation Maintenance Technician School
(2) Practical experience gained by maintaining airframes and/or powerplants
(3) Military experience. Experience gained by maintaining civilian and military aircraft, as an airframe or powerplant mechanic helper, will be evaluated on its own merits to determine whether it fulfills the experience requirements of FAR § 65.77.

Military Experience

Applicants who have not graduated from an FAA-approved Aviation Maintenance Technician School and are applying based on military experience must prove their military aviation experience. The applicant should supply the following documents:

(a) A properly completed Form DD-214, which lists the total time in service and the Military Occupational Specialty (MOS) codes the applicant was assigned.
(b) A letter from his/her maintenance officer, or classification officer that certifies the applicant's length of military service, the

amount of time the applicant worked in each MOS, the make and model of aircraft and/or engine on which the applicant acquired the practical experience, and where the experience was obtained.
(c) Training records showing the type of aviation schools the applicant attended.
(d) Record of on-the-job training.
(e) Performance Appraisal (PER) documenting performance in that career discipline.

Military experience can only be used, if it is applicable to the certificate and ratings sought.

Civil Experience

Applicants who have not graduated from an FAA-approved Aviation Maintenance Technician School and are applying based on civil experience must also produce documents to establish the required record of time and experience. These records must show the applicant has the basic knowledge and skills with the procedures, practices, materials, tools, machine tools, and equipment used in aircraft construction, alteration, maintenance, and inspection. The applicant should supply the following documents:
(a) A letter from his/her employer stating the amount of time the applicant worked at the facility. The letter should list the make and model of aircraft and/or engine on which the applicant acquired the practical experience, and where the experience was obtained.
(b) Training records showing any type of aviation schools the applicant attended.
(c) Record of on-the-job training.

Maintenance School Graduates

An applicant who graduates from an FAA-approved Aviation Maintenance Technician School may present a certificate of graduation or completion to demonstrate training appropriate to the rating(s) sought. The Aviation Maintenance Technician School must ensure that each graduate possesses the minimum knowledge for the certificate(s) sought. They accomplish this by testing the individuals in all subject areas taught.

Written Test

After an FAA airworthiness safety inspector is satisfied that the applicant is eligible to take the written test, the applicant must fill out FAA Form 8610–2, Airmen Certification and/or Rating Application. The FAA inspector signs the form and issues the applicant FAA Form 8060–7, Airman's Authorization for Written Test. If the applicant is authorized to take both the Airframe and Powerplant tests the applicant receives three separate authorizations. One authorization is for the General test, one is for the Airframe test, and one is for the Powerplant test.

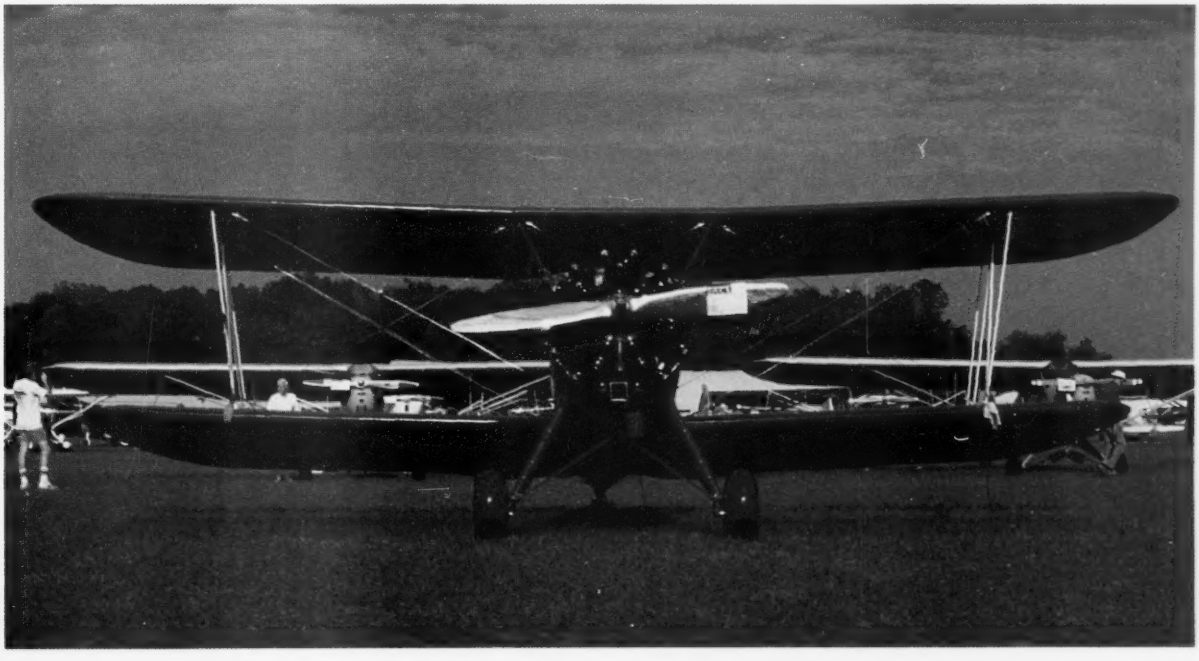
The applicant presents these authorizations to a Written Test Examiner, who administers the test to the applicant. After successful completion of the written test (70% to pass) the applicant is qualified to take the oral and practical test. The results of the written test are good for 24 months.

Oral and Practical Test

The applicant must present a valid AC Form 8080–2 to show successful complete of the written test. The applicant will also need a valid copy of FAA Form 8610–2 to arrange to take the oral and practical tests with an FAA designated maintenance technician examiner. Applicants can locate designated maintenance examiners by checking the current edition of FAA Advisory Circular, AC 183–32, FAA Designated Maintenance Technician Examiners Directory, which lists the name and address of each designated examiner and the types of tests each is authorized to give. Upon successful completion of the oral and practical tests, the designated examiner can issue the appropriate certificate.

As you can see from this brief outline, attending an approved maintenance school only provides the experience necessary to start the A&P certification process. The final certification check is the FAA written, oral, and practical test.

For additional information on A&P testing procedures, interested readers can contact their local Flight Standards district office (FSDO). In addition to their local telephone directories, the addresses and telephone numbers of the various FSDO's are listed in the FAA Airport/Facility Directory for their respective region.



Jan Monroe

Creve Couver, MO, airport

Flood Damaged Aircraft Pose Potential Threat

FAA's Aircraft Maintenance Division reports that during the recent floods in the midwestern part of the United States some aircraft suffered water damage. The flood water not only did damage to the aircraft,but it also deposited a layer of mud, organic matter, and various chemicals (some possibly toxic) into and upon everything it touched.

The FAA has received reports of aircraft not receiving thorough cleaning after the flood waters receded and of aircraft being flown after a cursory washing. Proper cleaning and restoration of the airframe, engines, propellers, and all the other appliances after a flood is a complex endeavor. Manufacturers do not list cleaning or restoration instructions for aircraft submerged in flood water. Although the following is not complete and comprehensive for all aircraft, some areas of concern are listed below:

1. The structures in metallic aircraft have very little access for cleaning, so gaining access to every compartment or bay of the wings, fuselage, tail, and control surfaces may be difficult or even impossible. Once the area is rinsed, how are the contaminants removed? Many aircraft with internal and/or external stiffeners have only small drain holes at the ends. There may be no sure way to clean some structure short of total disassembly.

2. Wooden structure aircraft were built with casein glue, which is not waterproof. Some glues are water resistant, but were never meant to withstand long-term immersion. How to decide the strength of wooden glue joints after submersion in flood water may be very difficult. Cracks or other defects in wood finishes may allow mud and/or other contaminants to contact the wood, also wood is dried to a specific moisture content and normally remains at a fairly constant value afterwards. The moisture content may increase dramatically after immersion, especially if the finish is not totally waterproof. Several conditions can develop from being submerged in flood water such as *dry rot* (which actually occurs in wet wood), and corroded hardware. Some bolts and bushings in direct contact with wooden structures have surface corrosion with reasonable protection from the elements. After being submerged in flood water, corrosion will be accelerated.

3. Steel tube and fabric structure aircraft can have many problems. Mud and slime may become trapped in the fabric forming a moisture trap, water can find its way into the tubing structure, and corrosion from the inside may be difficult to locate until severe damage has occurred. Aircraft covered with cotton or linen may have its life shortened dramatically. Synthetic fabrics are less likely to show damage, but any defects in the finish may accelerate the chance of the finish peeling.

4. Flexible wire control cables are susceptible to corrosion and wear from grit and moisture soaking in and removing lubrication. Cables usually consist of thin wires braided together and any damage could cause loss of those control surfaces. The acceptable way of checking cables is to remove the tension and "birdcage" to see cable strands inside. (See Advisory Circular 43.13–1A, Acceptable Methods, Techniques and Practices—Aircraft Inspection and Repair, a U.S. Government Printing Office sale item.) New cables may be the only sure way to eliminate the possibility of damaged cables.

5. Rod end bearings, bearings in pulleys and, hinge points on control surfaces are all subject to failure, and/or restricted use from corrosion, grit, and lack of lubrication.

6. Aircraft engines may pose problems after water immersion and cleaning can be a complex operation. An oil change and a general wash may result in extensive damage if grit and dirt are not removed from the many tiny, hard to get to crevices. (Example: piston ring grooves, etc.)

7. A fixed pitch wooden propeller is subject to absorbing moisture, and being submerged in flood waters could have a disastrous effect on the strength of glue joints. This also could effect the static and dynamic balance of wooden propellers. Constant speed propellers have blade bearings and pitch change mechanisms which operate under variable loads. Foreign materials (grit, rust, contamination) could lead to catastrophic failures of the units.

8. Aircraft engines have a number of driven accessories, each having an important function that contribute to safe operation. Magnetos, starters, generators, alternators contain precision bearings and other parts that are used to produce electrical energy for the operation of an aircraft engine and could fail if foreign materials are present.

9. Fuel systems need a clean supply of proper type fuel for dependable operations. An aircraft submerged in flood water could have contamination in the entire fuel system.

10. Instruments and avionics are critical to the operation of any aircraft. I tems installed in aircraft submerged in flood water may not operate freely or properly if contaminants are not completely removed.

11. Landing gears submerged in flood water are susceptible to corrosion (especially those with air/oil struts). The possible damage is loss of fluids and nitrogen due to contaminant damage by flood waters.

12. The electrical system on an aircraft is not immune from flood water damage. Corrosion in circuit breakers, switches, relays, and other connections can cause problems, and loss of systems essential for an aircraft operation.

An aircraft properly cleaned, lubricated, and maintained can be expected to give long and safe service after an incident as the flood of 1993. A flood damaged aircraft, misrepresented as "no damage history" may result in tremendous expenses, or even worse, a catastrophic accident.

Flight Standards District Office personnel should advise mechanics performing inspections on aircraft domiciled in the midwest where the flood of 1993 occurred to question the service history of aircraft and aircraft parts. Those performing inspections should be advised to inspect aircraft and aircraft appliance and parts for possible flood damage using this guidance and appropriate manufacturers guidance.

Hand Prop

Recently, a hand propping propeller accident was reported to the FAA. According to the report, when the aircraft would not start, the pilot decided to hand prop the aircraft. The pilot barely moved the prop before the engine fired. The prop then struck and killed the pilot. The pilot's wife, who was in the aircraft, had to stop the engine.

In an effort to prevent similar accidents, we want to review some safety tips for being near propellers in general and hand propping specifically. Everyone, and especially non-airmen, should treat all propellers with great respect. Each propeller has the potential of being able to start an engine with a minimum of movement such as in our tragic example. A defect in the grounding wire on your engine's magneto system could make your magneto "hot" even though the magneto switch is turned off. The important thing to remember is that whenever you are around an aircraft with a propeller, you must be prepared for that propeller to become a deadly threat. Because of this threat, the most important tip we can offer anyone is that no one should hand prop an aircraft if hand propping can be avoided. Yes, we know there are many aircraft without electrical systems and starters, but the following safety tips are as important to the operators of those aircraft, as the tips are to new pilots of aircraft with electrical systems who have never hand propped an aircraft. Standing in front of an aircraft trying to hand prop it is not an experience that anyone can take lightly. One mistake can be fatal.

The best way to avoid having to hand prop an engine is to keep the battery and starter system in good operating condition. This is especially important during cold weather. A new, warm, fully charged battery is the ideal. An old, cold, weak or dead battery in a snow-covered aircraft is the worst case. Most batteries are somewhere in between. The following ideas can make it easier for your battery to start your aircraft. You should: Keep your battery warm and fully charged; use the proper grade of oil for your local operating conditions; if needed, preheat your engine compartment if your aircraft is not kept in a heated hangar; make sure your charging system is working properly; and maintain your battery according to its manufacturer's recommendations. These are only some of the things you can do. You can ask your local maintenance technicians for more helpful hints. If you routinely "pull your prop through to limber up your engine," always remember to treat your prop as "alive" whenever you are near it.

If your battery cannot start your aircraft, you should ask your maintenance technician for help. It is safer to either replace a bad battery or to jump start an aircraft with a low battery than to hand prop the engine.

If you are determined to hand prop your aircraft, consider the following:

1. Make sure the aircraft is tied down securely. More than one aircraft has gotten away from its owner after being started by hand propping.

2. Make sure chocks are under the main wheels for the reason given for Number 1. Then do not walk into a prop trying to remove the chocks. More than one person has been killed by a prop strike trying to remove a chock. Recently a passenger walked into a rotating prop while trying to remove a nose-wheel chock after the pilot started the engine. Passengers are especially vulnerable around any type of aircraft. Because of the dangers of rotating props and jet blast on a flight line, all pilots should brief their passengers on flight line safety procedures before taking their passengers out on the line. Children should not be allowed to walk around the line without adult supervision. Non-airmen should not be asked to hand prop an aircraft or help start an aircraft without proper training.

3. Have someone in the pilot's seat who knows the recommended procedure for hand propping an aircraft and how to safely start your aircraft. Coordinate all activities with that person before attempting to start the aircraft.

4. Verify and re-verify all engine control settings and magneto switches before touching the propeller. An open throttle has resulted in more than one runaway aircraft that was not tied down.

5. Check your footing. You do not want to slip near a rotating prop and fall into the prop. You should wear clothing that does not restrict your movement. You should not wear clothing that might get caught on the prop.

6. Position your body so that your momentum from pulling the prop through moves you clear of the prop's

path. A test is you want to have to reach into the prop's path to grasp the prop.

7. We suggest you loosely grasp the prop with your finger tips only. Avoid wrapping your thumbs around the blades. That way, if the engine starts, your thumbs are out of the way.

8. Be prepared for the engine starting. You do not want to be startled into moving into the prop path. For those who have not hand propped an engine, standing that close to a rotating prop takes a while to get use to.

9. If your first attempt fails, take your time trying again. You do not want the engine to suddenly start when you are not prepared for it.

10. The last tip is, if you are still determined to hand prop an aircraft after reading steps one through nine, and if you are not experienced at hand propping, you should find someone who is experienced and ask him or her to show you the safe way to do it. As always, you should ask yourself the question, "Is the risk of an accident worth what I am trying to accomplish."

Pilot Killed by Main Rotor

The following safety article appeared in the Civil Aviation Authority's GASIL (the United Kingdom's General Aviation Safety Information Leaflet). It was reprinted from Transport Canada's Aviation Safety Vortex. ***—Editor***

The owner of a fishing lodge, located 30 miles north of Bella Coola, British Columbia, took off on a VFR flight from his Dean River base camp to another camp, located 30 miles west on the Kitlope River. He landed his Hughes 500C, picked up four sport fishermen, and continued 20 miles northwest to the Tsaysis River. He dropped off his passengers at three sites along the river, returning to the center location to join one of the fishermen.

After shutting down the engine, the pilot got out of the 500 and retrieved a cleaning rag and some solution from behind the passenger seat. With the rotor still turning, the pilot climbed on to the left side of the helicopter, intending to clean the windscreen. As he raised himself to a standing posture, on the left cockpit door sill, his head passed into the plane of the main rotor. He was killed when his head was struck by three of the four blades.

The pilot had about 2,500 hours of helicopter time, the majority of which was in the Robinson R22. Four months before the accident he had sold his R22 and about three weeks prior to the accident he had stared flying the 500. In the three week period before the accident, he flew 32 hours on the new machine. He was type rated on the Hughes.

The pilot was reported to have been meticulous about the cleaning of the windscreen, primarily to enhance flight visibility for safety reasons, but also to accommodate passengers who wished to take photographs. On this occasion, the windscreen needed cleaning.

The landing area was level and was located about 150 feet from the Tsaysis River.

The cyclic was found in a nearly neutral position, laterally centered and inclined slightly forward. The cyclic trim actuator motors were found to operate properly through the normal range of travel.

The helicopter was not equipped with a rotor brake. So after engine shutdown in a no-wind condition, the rotor system would continue to turn for about three minutes.

On the Hughes 500C with high skid gear, the distance between the ground and the rotor blades, with the disc level, is 8.3 feet. While the distance from the ground to the top of the windscreen, is 6.3 feet, it is 4.3 feet from the cockpit door sill to the top of the windscreen and 5.7 feet from the door sill to the rotor blades. The pilot was 5.8 feet tall. When the pilot was standing upright on the door sill, his head extended slightly more than one inch into the plane of the main rotor.

On the other hand, on the Robinson R22 (the helicopter he was more familiar with), the distance from the ground to the rotor is 8.8 feet and the distance from the ground to the top of the windscreen is 5.7 feet.

Editor: One can see that a pilot of average stature can clean the windscreen of an R22 without getting his/her head into the main rotor. This is true only as long as the pilot keeps his/her feet on the ground, but I don't think its a good idea to be doing anything to the helicopter until all the parts stop moving. Why not wait the short time it takes for the blades to stop?

To Whom It May Concern

Effective January 6, 1994, pilots operating in the San Juan Islands, WA, area should monitor 128.25 MHz for air traffic activity reports within the area. Air traffic congestion in the San Juan Islands has increased to the point where pilots have recommended that a single discrete radio frequency be assigned for the islands area. The intent is for all pilots in the island area to be aware of activities which may affect their operations. This would also provide a frequency which is protected from interference from distant sources.

Please call (206) 227–2536 if more information is required.

The FAA Needs Your Help

FAA Advisory Circular (AC) 90–89, *Flight Testing Amateur-built Aircraft,* is scheduled to be revised starting January 3, l994.

The FAA plans to enhance and enlarge the popular AC by including flight testing information on high performance and ultralight/micro-light aircraft.

The FAA is requesting that amateur-built aircraft test pilots share their expertise in flight testing techniques and good common sense practices. Please submit your ideas or comments in writing to:

Federal Aviation Administration
AFS-310
800 Independence Avenue S.W.
Washington, DC 20591
Attention: Bill O'Brien

You can FAX your comments by calling (202) 267–1551.

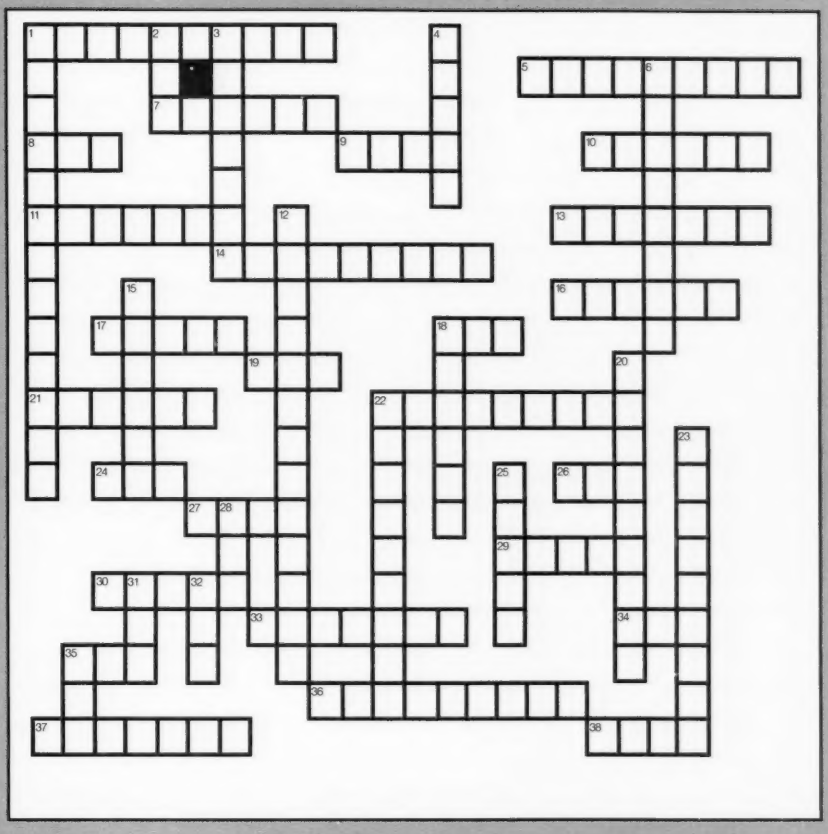
Pilot Puzzle

ACROSS

1. Load vs. weight *(2 words)*
5. Parasol
7. Engine-less aircraft
8. Psuedo military ILS
9. Flight Standards District Office
10. Forward control wing
11. Little wing (Fr.)
13. Updraft
14. Propeller driven rotorcraft
16. Your choice
17. Will comply
18. Required above FL240
19. Minimum enroute altitude
21. Inflight advisory
22. Airport
24. Controllers abrv.
26. New NAV system
27. Franklin's airship
29. Radio detection and ranging
30. Motion lotion
33. O'Hare's old name
34. Above ground level
35. Not VFR
36. Class B entry requirement
37. Third Class, e.g.
38. _____ rating

DOWN

1. Over 12,500 pounds *(2 words)*
2. Hydrometeor
3. Broken or overcast
4. Aviator
6. Cloud like streamer
12. Course reversal *(2 words)*
15. Weather hazard
18. Great circle route
20. Horizontal wind at altitude
22. Substitute
23. Narrow band of weather *(2 words)*
25. Long range NAV system
28. Precision approach
31. Visual rules
32. Homing device
35. Good in drinks only



The first 10 correct crossword puzzles submitted to the Cleveland FSDO will win an FAA video tape. The correct answers will appear in the next issue of the *FAA Aviation News*. Submit your completed pilot puzzle along with your name and address to:

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